PRIMA

PARTNERSHIP FOR RESEARCH AND INNOVATION
IN THE MEDITERRANEAN AREA

Funded Projects 2020

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IN THE MEDITERRANEAN AREA

Funded Projects 2020

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

Agence Nationale de la Recherche
ANR

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

PRIMA
PARTNERSHIP FOR RESEARCH AND INNOVATION
IN THE MEDITERRANEAN AREA

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.

The PRIMA programme is supported by Horizon 2020, the Framework European Union's Programme for Research and Innovation.

PRIMA, Funded Projects 2020 - June 2021

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Foreword

Angelo Riccaboni
Chair PRIMA Foundation

"The Mediterranean, in its diversity and richness, can be an example of the post-pandemic recovery, through innovation and social inclusion. PRIMA is willing to contribute to it, aligning national efforts and promoting sustainable development for all in a crucial area such as agrifood systems".

Mohamed El-Shinawi
Co-Chair PRIMA Foundation

"Partnership is a hallmark of science and research. We simply can't progress without it – across disciplines, institutions and borders. Scientific research and innovation has experienced dramatic changes in recent years. There is no doubt that it should be viewed in the global context and not solely from a domestic point of view. That is why PRIMA as the most ambitious joint programme is crucial for shaping the future of the Euro-Mediterranean region".

The PRIMA Program, jointly funded by the European Commission and 19 Euro-Mediterranean States is characterized by a strong strategic dimension, the principle of equal footing among participating States and a distinctive geographical focus on the Mediterranean region. In 2020, the Program has funded **46 projects** for a total funding of around **64 million euro**, constituting it around 20% more than 2019.

While entering its fourth year of activity, PRIMA has since the beginning funded **129 projects** with 1183 research units involved, for a total of approximately **165 million euro**. This proves its contribution in terms of strengthening research and innovation capacities and creating a critical mass of actors. Each proposal has been 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**.

From a scientific point of view, in addition to the three main thematic areas (efficient management of water resources, sustainable farming systems and agri-food value chain), a **nexus approach** is strongly promoted. In fact, it is evident that many of the challenges we are facing are better addressed adopting an integrated approach among themes. On water-energy-ecosystem nexus PRIMA is co-organizing a high level conference in September 2021 together with Union for the Mediterranean, JRC and the Cyprus Institute.

With a distinctive focus on the Mediterranean area, PRIMA intends to address issues such as water scarcity, food security, nutrition, animal health, food loss and waste, soil degradation and farmers' productivity and livelihood, promoting also an effective implementation of the **Sustainable Development Goals** (SDGs).

The successful management of the Programme has allowed PRIMA establishing fruitful synergies and close collaboration with a variety of stakeholders (SDSN, Anna Lindh Foundation, Parliamentary Assembly of Mediterranean) national and International Institutions (FAO, WFO, European Commission, Union for the Mediterranean, UNEP, UNIDO) and Initiatives (EIT Food, JPI Water, CBC Med). In a changing time, with several challenges ahead **the role of cooperation and partnerships**, especially in a key area as the Mediterranean, the role and experience of PRIMA turns to be of great relevance. A case in point of similar collaborations is currently the participation of PRIMA in the Independent Dialogues conducted in view of the UN Food System Summit.

Forward looking, PRIMA is committed to align its activities to **the new framework designed at EU level**, in relation to sustainability, transformative innovation, and adaptation to climate change. The EU Green New Deal and Horizon Europe are key documents PRIMA is looking at, with an even greater 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 Farm to Fork Strategy, the Biodiversity Strategy, the carbon-neutrality and the Missions promoted at EU level are additional instruments and points of reference for PRIMA. In this regard, a thematic collaboration with the Mission Soil Health and Food is under discussion. Similarly, PRIMA is active in the debate concerning the new strategic priorities for the Mediterranean region, as promoted by the Union for the Mediterranean.

The new paradigm that will emerge from after the pandemic will require radical transformations in many aspects and sectors. The challenges we have to face

cannot but rely on research and innovation, cooperation and prompt implementation of the most advanced solutions. Bearing this in mind, we are even more committed to ensure PRIMA expresses its full potential with the ultimate goal of contributing to the recovery, resilience and prosperity of the Mediterranean.

Calls Report PRIMA 2020

Calls Report PRIMA 2020

Section I
at a glance

15 Funded Projects

4,7% SUCCESS RATE

325 Proposals submitted

of which

Projects per nationality of coordinating Entities

7 6 1 1

4 5 4 2

Projects per thematic area

17 Participating States

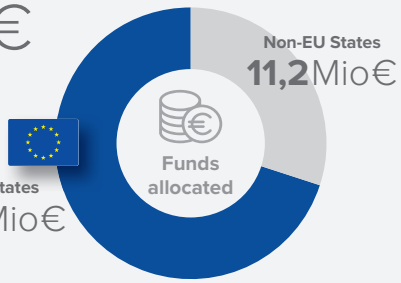
of which

9 EU States

8 Non-EU States

33,2 Mio€ Budget

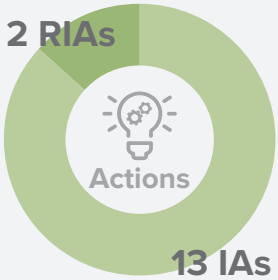
+6,9 Mio€ compared to 2019



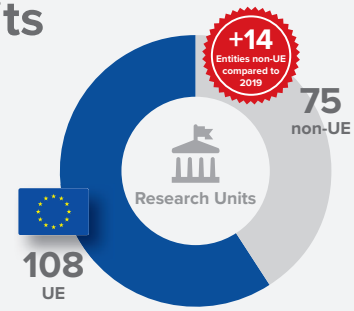
Actions

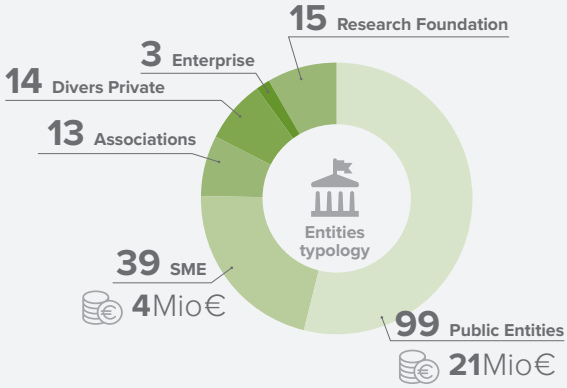
Research and Innovation Actions 2

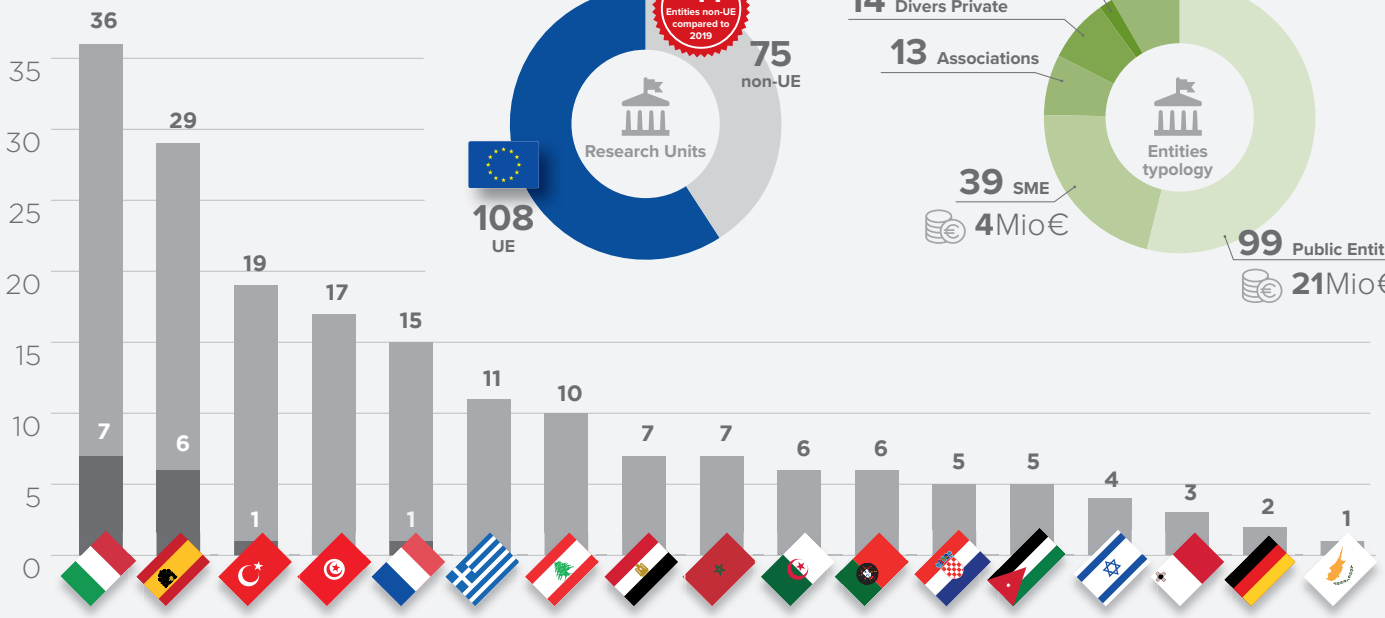
Innovation Actions 4 3 4 2



183 Research Units







Research Units per nationality

Section I

Projects per thematic area

- Water Management
- Farming Systems
- Agri-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.

SECTION I

Funded Projects		States	Research Units	Budget
1 **ACQUAOUNT** Adapting to Climate change by QUantifying optimal Allocation of resOUrces and socio-ecoNomic inTerlinkages	IA	Italy		2.474.006 €
		Greece		
		Jordan		
		Lebanon		
		Spain		
		Tunisia		
		6	**9**	
2 **MAGO** Mediterranean wAter management solutions for a sustainable aGriculture supplied by an Online collaborative platform	IA	Spain		2.495.500 €
		Tunisia		
		France		
		Greece		
		Lebanon		
		5	**11**	
3 **TALANOA-WATER** Talanoa Water Dialogue for Transformational Adaptation to Water Scarcity Under Climate Change	IA	Spain		2.500.000€
		Egypt		
		Italy		
		France		
		Lebanon		
		Tunisia		
		6	**8**	

SECTION I

4

TRUST

Management of industrial Treated wastewater ReUse as mitigation measures to water Scarcity in climaTe change context in two Mediterranean regions

IA

Italy	
France	
Turkey	
Spain	
Tunisia	
Algeria	
6	**13**

1.985.000 €

5

MEDIBEES

Monitoring the Mediterranean Honey Bee subspecies and their resilience to climate change for the improvement of sustainable agro-ecosystems

RIA

Spain	
Jordan	
Algeria	
Italy	
Lebanon	
Malta	
Portugal	
Turkey	
8	**9**

1.750.000 €

6

NEWFEED

Turn food industry by-products into secondary feedstuffs via circular-economy schemes

IA

Spain	
Greece	
Egypt	
Turkey	
4	**14**

2.057.528 €

7

SCALA-MEDI

Improving sustainability and quality of Sheep and Chicken productions by leveraging the Adaptation potential of LocAl breeds in the MEDIterranean area.

RIA

Italy	
Tunisia	
Algeria	
Morocco	
France	
5	**17**

1.750.000 €

8

SURFOLY

SUstainable Ruminants Feed with OLive pomace and polYphenols enriched charred olive stone

IA

Italy	
Morocco	
Lebanon	
3	**5**

2.209.000 €

9

SUSTAvianFEED

Alternative animal feeds in Mediterranean poultry breeds to obtain sustainable products

IA

Spain	
Italy	
Tunisia	
Turkey	
4	**8**

2.299.388 €

10

FLAT BREAD MINE

TFlat Bread of Mediterranean area; INnovation and Emerging process and technology

IA

France	4
Croatia	2
Italy	2
Lebanon	2
Malta	2
Spain	2
Egypt	1
Jordan	1
Greece	1
Portugal	1
10	**18**

2.072.042 €

11

FunTomP

Functionalized Tomato Products

IA

Turkey	5
Croatia	3
Spain	2
Greece	1
Italy	1
Lebanon	1
Portugal	1
Tunisia	1
8	**16**

1.905.211 €

12

LOCALNUTLEG

Developing of innovative plant-based added-value food products through the promotion of LOCAL Mediterranean NUT and LEGume crops

IA

Spain	4
Israel	3
Portugal	3
France	2
Italy	2
Germany	1
Morocco	1
Turkey	4
8	**20**

2.000.000 €

13

MEDWHEALTH

Development of new wheat-derived foods of the Mediterranean diet with improved nutritional and health value

IA

Italy	3
Lebanon	2
Algeria	1
Morocco	1
Tunisia	1
Turkey	1
6	**9**

1.877.500 €

14

LENSES
Learning and action alliancEs for NexuS EnvironmentS

IA

Italy	4
Greece	3
Spain	2
Turkey	2
Jordan	1
Israel	1
6	**13**

2.998.000€

15

NEXUS-NESS
NEXUS Nature Ecosystem Society Solution: Fair and Sustainable Resource Allocation Demonstrator of the Multiple WEFE Nexus Economic, Social and Environmental Benefits for Mediterranean Regions

IA

Italy	5
Tunisia	2
Cyprus	1
Egypt	1
France	1
Germany	1
Spain	1
7	**13**

2.850.000 €

Calls Report PRIMA 2020

Section II
at a glance

31
Funded Projects

19,2% SUCCESS RATE

161
Proposals submitted

of which

Projects per nationality of coordinating Entities

12 | 9 | 3 | 3 | 3 | 1

16
Participating States
of which

10 EU States

6 Non-EU States

31 Mio€
Budget

+2,6 Mio€ compared to 2019

EU States **24,7 Mio€**

Non-EU States **6,3 Mio€**

Finanziamenti assegnati

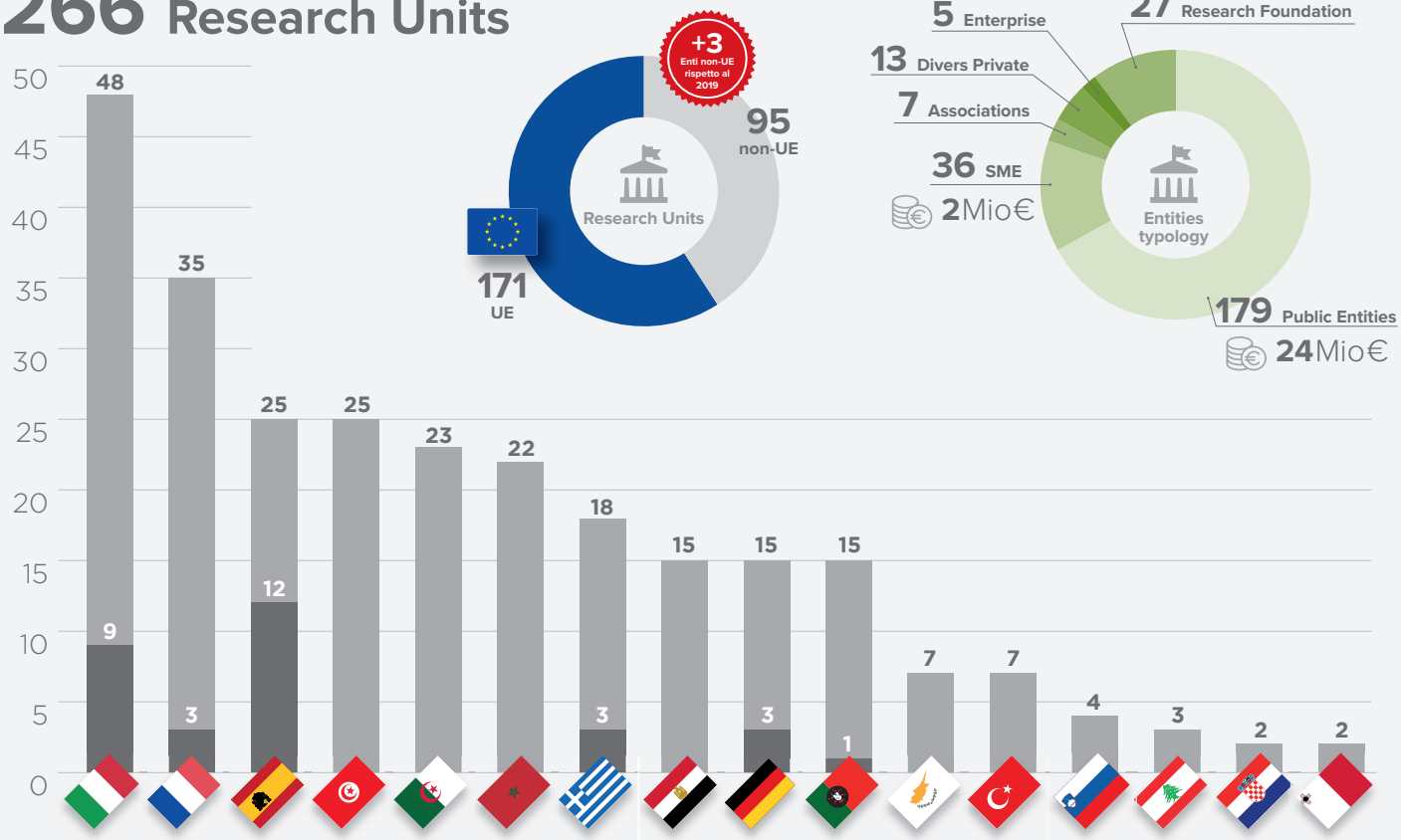
5 | 18 | 8

Projects per thematic area

Actions

all RIAs
Research and Innovation Actions

266 Research Units



+3 Enti non-UE rispetto al 2019

95 non-UE

171 UE

Research Units

5 Enterprise
27 Research Foundation
13 Divers Private
7 Associations
36 SME
2 Mio€

Entities typology

179 Public Entities
24 Mio€

Research Units per nationality

Section II

Projects per thematic area

Water Management

Farming Systems

Agri-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.

SECTION II

Funded Projects		States	Research Units	Budget
1 **DATI** Digital Agriculture Technologies for Irrigation efficiency	RIA	Italy, France, Morocco, Portugal, Spain	5	7	1.020.180€
2 **HANDYWATER** Handy tools for sustainable irrigation management in Mediterranean crops	RIA	Spain, Germany, Italy, Morocco, Egypt	5	9	897.226 €
3 **INTEL-IRRIS** Intelligent Irrigation System for Low-cost Autonomous Water Control in Small-scale Agriculture	RIA	France, Algeria, Morocco, Germany, Greece	5	8	1.038.680 €
4 **IRRIWELL** A novel plant-based approach to estimate irrigation water needs of orchards for an optimal water management	RIA	Spain, France, Germany, Morocco, Tunisia	5	7	1.038.229 €

SECTION II

5

MED-WET

Improving MEDiterranean irrigation and Water supply for smallholder farmers by providing Efficient, low-cost and nature-based Technologies and practices

RIA

Germany	1
Malta	2
Morocco	2
Portugal	2
Egypt	1
5	**8**

1.030.219 €

6

4BIOLIVE

Production of Biostimulants, Biofertilizers, Biopolymers and Bioenergy from OLIVE-oil chain residues and by-products

RIA

Italy	1
Tunisia	2
Algeria	1
Spain	1
4	**5**

641.000 €

7

Biopesticides

Development of Bio-Pesticides and -Herbicides for Sustainable Agricultural Crop Production

RIA

Germany	3
Greece	2
Turkey	2
Algeria	1
Tunisia	1
5	**9**

1.699.351 €

8

CHANGE-UP

Innovative agroecological APProaches to achieving resilience to climate CHANGE in Mediterranean countries

RIA

Italy	2
France	2
Algeria	1
Morocco	1
Tunisia	1
5	**7**

1.061.944 €

9

DROMAMED

Capitalization of Mediterranean maize germplasm for improving stress tolerance

RIA

Spain	2
Italy	2
Algeria	1
Germany	1
France	1
Morocco	1
Portugal	1
Tunisia	1
Turkey	1
9	**11**

1.455.721 €

10

ECHINO-SAFE-MED

New sustainable tools and innovative actions to control cystic ECHINOcoccosis in sheep farms in the MEDiterranean area: improvement of diagnosis and SAFEty in response to climatic changes

RIA

Italy	
Algeria	
Australia	
France	
Greece	
Svizzera	
Tunisia	
7	**8**

779.816 €

11

ISFERALDA

Improving Soil FERtility in Arid and semi-arid regions using Local DAte palm residues

RIA

France	
Algeria	
Greece	
Tunisia	
4	**8**

580.182 €

12

MA4SURE

Mediterranean Agroecosystems for Sustainability and Resilience under Climate Change

RIA

Spain	
Egypt	
Italy	
France	
Slovenia	
5	**8**

837.294 €

13

MiDiVine

Innovative Approaches Promoting Functional Microbial Diversity for a Sustainable Grapevine Health and Productivity in Vineyard Systems of Mediterranean Areas

RIA

France	
Cyprus	
Portugal	
Morocco	
Spain	
Tunisia	
6	**8**

807.874 €

14

OPTIMUS PRIME

Optimal usage of natural product and biological priming agents to improve resilience of agrosystems to climate change

RIA

Spain	
Italy	
Morocco	
Cyprus	
Greece	
Turkey	
6	**9**

815.489 €

15

PROSIT

Plant microbiomes in sustainable viticulture

RIA

Italy	
Algeria	
France	
Germany	
4	**6**

1.050.608 €

16

ProSmallAgriMed

Promoting soil fertility, yield and income in smallholder agriculture of semiarid and arid Mediterranean regions by management of beneficial soil microbiota, conservation agriculture and intercropping

RIA

Italy	
Algeria	
France	
Morocco	
Tunisia	
5	**12**

1.066.375 €

17

ReCROP

Bioinocula and CROPping systems: an integrated biotechnological approach for improving crop yield, biodiversity and Resilience of Mediterranean agro-ecosystems

RIA

Portugal	
Spain	
France	
Egypt	
Italy	
Morocco	
Tunisia	
7	**12**

1.398.127 €

18

RESCHEDULE

RESilient to Climate CHange Extremes MeDiterranean AgricUltural Systems: LEveraging the Power of Soil Health and Associated Microbiota

RIA

Greece	
Germany	
Italy	
Portugal	
Tunisia	
5	**6**

1.277.728€

19

REVINE

Regenerative agricultural approaches to improve ecosystem services in Mediterranean vineyards

RIA

Italy	
Cyprus	
Portugal	
Egypt	
France	
Tunisia	
6	**15**

827.835 €

20

SafeAgroBee

Safeguarding agroecosystem's resilience under climate change through efficient pollination and sustainable beekeeping

RIA

Greece	
Croatia	
Italy	
Lebanon	
Slovenia	
Algeria	
Cyprus	
France	
8	**13**

1.183.000 €

21

SUSFORAGE
Sown forage mixtures for sustainable agroecosystems in the Mediterranean area

RIA

Spain	
France	
Germany	
Lebanon	
Slovenia	
5	**6**

815.310 €

22

TRANSITION
Innovative resilient farming systems in Mediterranean environments

RIA

Spain	
France	
Greece	
Algeria	
Egypt	
Italy	
6	**10**

1.149.456 €

23

UToPIQ
Use of Tomato lines tolerant to Proximity shade to Increase yield and Quality in intercropping agrosystems

RIA

Spain	
Morocco	
France	
Italy	
4	**5**

791.180 €

24

AGRICOMPET
Governing the agri-food supply chain: how to improve smallholders competitiveness

RIA

Spain	
Italy	
France	
Greece	
Turkey	
5	**7**

938.096 €

25

GourMed
Governance of food supply chain to equilibrate price and profits of high quality and safe Mediterranean foods

RIA

Greece	
Algeria	
Germany	
Italy	
Tunisia	
5	**6**

952.609 €

26

ImPUISe
Innovation in the by-product supply chain of citrus in the Mediterranean area

RIA

Germany	
Tunisia	
Egypt	
Algeria	
France	
Turkey	
6	**15**

1.334.393 €

SECTION II

27

LAB4SUPPLY

Multi-agent Agri-food living labs for new supply chain Mediterranean systems; towards more sustainable and competitive farming addressing consumers' preferences and market changes

RIA

Spain	
Algeria	
Morocco	
Egypt	
France	
Greece	
Italy	
7	**9**

1.120.070 €

28

MED-LINKS

Data-Enabled Business Models and Market Linkages Enhancing Value Creation and Distribution in Mediterranean Fruit and Vegetable Supply Chains

RIA

Italy	
Egypt	
Greece	
Morocco	
France	
5	**11**

1.082.267 €

29

OIL4MED

Open platform and falrness olive oil supplY chain for MEDiterranean small farmers

RIA

Spain	
Tunisia	
France	
Portugal	
4	**5**

589.800€

30

ORABBIT

Omega RABbit: food for health BenefIT

RIA

Italy	
France	
Tunisia	
Egypt	
4	**10**

888.826 €

31

VallCET

Valorise foods and Improve Competitiveness through Emerging Technologies applied to food by-products within the circular economy framework

RIA

Spain	
Italy	
Tunisia	
France	
Portugal	
5	**8**

787.000 €

Calls Report PRIMA 2020

Section I+II
overall data

46 Funded Projects

9,5% SUCCESS RATE

486 Proposals submitted

of which

Projects per nationality of coordinating Entities

18 | 16 | 4 | 3 | 3 | 1 | 1

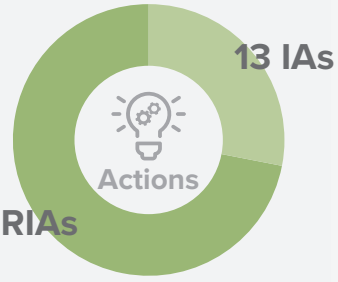
9 | 23 | 12 | 2

Projects per thematic area

Actions

Research and Innovation Actions: 5 | 20 | 8

Innovation Actions: 4 | 3 | 4 | 2



18 Participating States

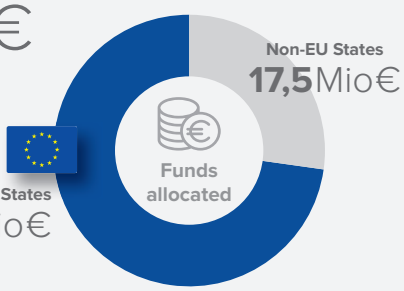
of which

10 EU States

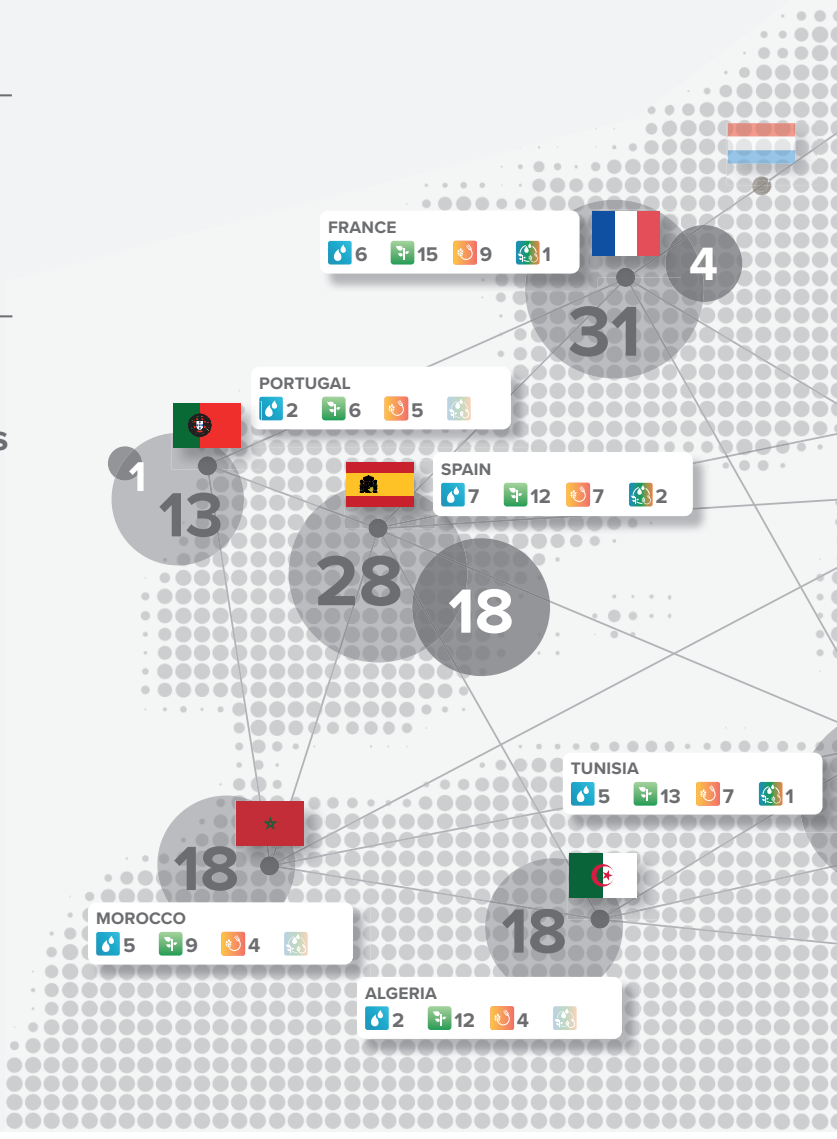
8 Non-EU States

64,2 Mio€ Budget

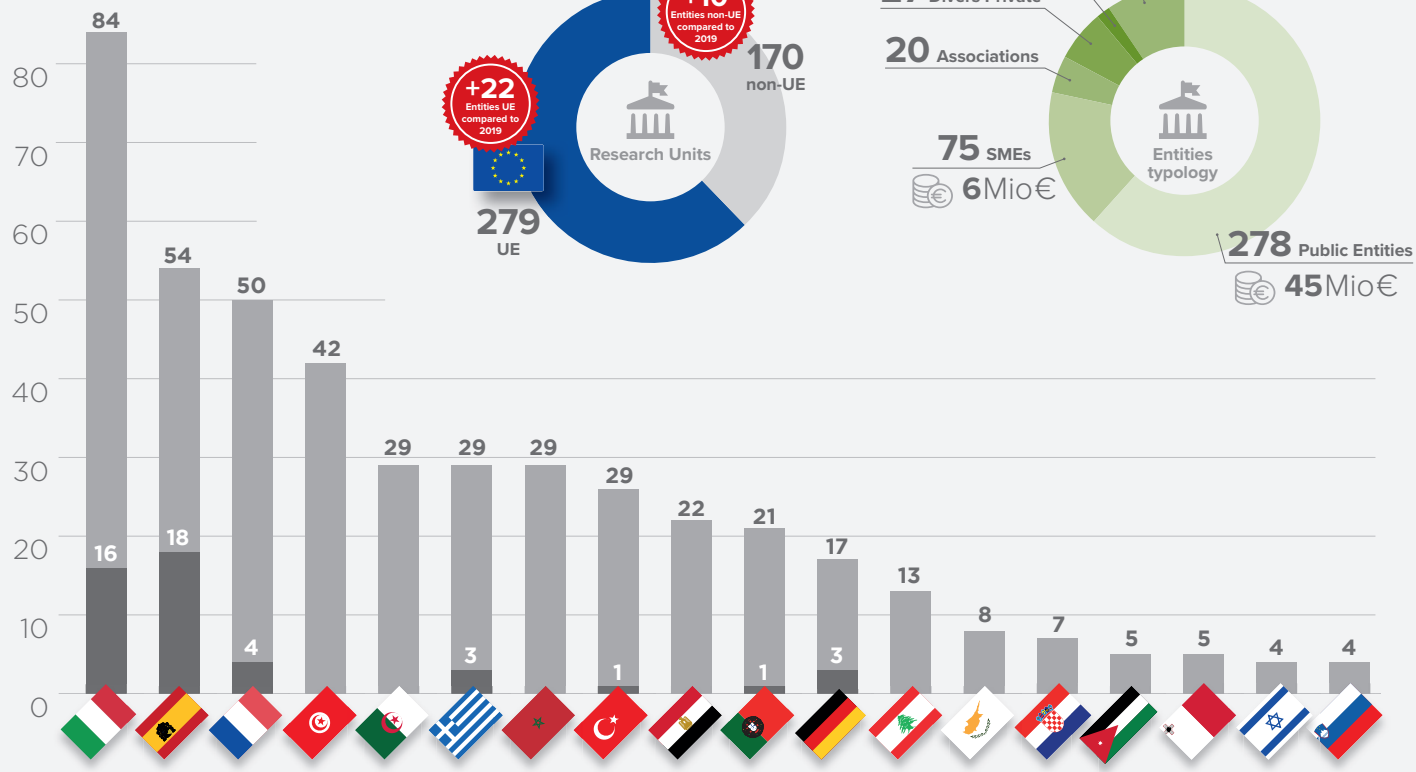
UE+Participating States

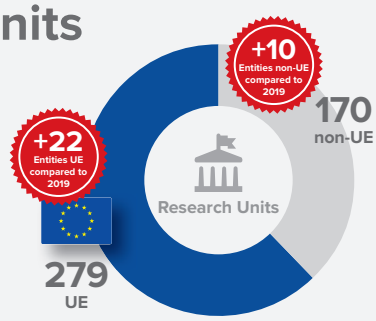


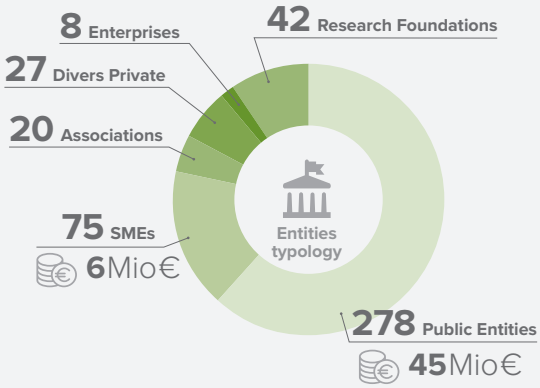
+9,3 Mio€ compared to 2019



449 Research Units







Research Units per nationality

Overall results

In the **2020 calls**, PRIMA, the Partnership for Research and Innovation in the Mediterranean Area, has allocated **64.2 million Euros** for funding **46 Research and Innovation Projects**. The allocated budget is an increase of more than 10 million Euros compared to 2019.
Compared to the past three years, 2020 has witnessed the highest number of **beneficiary institutions (449)**, mainly universities from the public sector. It has also seen institutions from the private sector like large enterprises, small and medium-sized enterprises, foundations, and research institutes.
The data shows the vital commitment of the European Commission and the 19 Euro-Mediterranean countries participating in the Partnership in supporting **research and innovation in the agri-food and water management sectors**.
The projects are divided into two sections: Section 1, which includes 15 projects funded by the European Commission under the European Framework Programme for Research and Innovation who have allocated 33.2 million Euros; Section 2, which collects, instead, 31 Projects funded by the funding agencies of the participating countries (31 million Euros).
33 projects out of 46 are **research and innovation actions (RIAs)**, and **13** are **innovation actions (IAs)**. Compared to the previous round, IAs have increased in number (eight in 2019 compared to 13 this year) and allocated budget (about **30 million euros**, compared to 12.5 million last year).

Content of the thematic areas

The Thematic Areas addressed by the 46 Projects are four: Water Resources Management, Agricultural Systems, Agri-Food Value Chains and WEFE Nexus.

Within the framework of the Thematic Area **Water Management**, the following topics are covered:

- Implementation of sustainable and integrated management of water resources in the Mediterranean under climate change conditions.
- Low-cost, lean solutions to improve irrigation efficiency in smallholder farms.

In general, the **9 Projects financed** in this thematic area aim to overcome **water scarcity** in the arid and semi-arid regions bordering the Mediterranean. Among the proposed solutions are innovative stakeholder-based **water management models**, the reuse of non-conventional water resources, and **innovative irrigation systems**.

Regarding the thematic area of **Farming Systems**, the **23 funded projects** focused on the following topics:

- Genetic preservation and animal feed, in turn, structured in the following two sub-topics:
  - Enhancement of local animal genetic resources.
  - Alternative animal feed.
- Redesign of agricultural livelihood systems to ensure their resilience.

These topics aim to guarantee **animal welfare** and an **adequate economic return** for operators. There are two significant challenges that the agri-food sector faced within the most recent European initiatives in this field, such as the Strategy "From producer to consumer" of the European Commission and the following Common Agricultural Policy 2021-2027.
In this regard, some projects aim to improve the capability to adapt to **climate change**, certain species for breeding (including sheep, poultry, and bees), and **sustainable feed**, including the exploitation of derived products and by-products. Other projects **reduce the input of substances chemicals**, such as pesticides and fertilisers, favouring more natural and sustainable cultivation methods. They also ensure an increase in **carbon sequestration in the soil** to protect its health and prevent its degradation.

These issues also demonstrate how PRIMA develops with the priorities of the European and global issues on **climate neutrality and sustainability of agri-food systems**.

The topics discussed by the **12 Projects** funded in the thematic area of the **Agrifood Supply Chains** are:

- Enhancement of the health benefits of typical diet foods in the Mediterranean.
- New models of optimising the agri-food chain, ensuring a fair price for consumers and a reasonable profit share for farmers.

Here, it is notable the benefits deriving from some typical foods of the **Mediterranean diet** and the creation of **innovative products** (including new types of **protein**) intended for both human and human consumption animals. In addition, there is a need to adopt **production models and sustainable distribution** and guarantee an adequate **economic return** for farmers.
In this regard, some Projects intend to develop **new business models** that favour **small farmers and small companies**. They also aim at promoting organisational and management solutions, develop voluntary systems for sustainability certifications, and establish new participation and co-creation mechanisms, such as living labs.

Finally, the **2 Projects funded** under the **Nexus** thematic area are focused on the demonstration of the **beneficial effects** – not only on health topics (**One vision Health**) but also on economic and social aspects – of the nexus approach (water-energy ecosystem-food) through the collection of good practices and the implementation of partnerships. This corresponds to the belief that an integrated system enhances existing experiences and the broadest involvement of implementation methods and innovation use.

Methods of implementation and use of innovation

This year, in particular, the tools and methods of implementation used by the 46 Projects are characterised for a **high level of innovation**, understood in all its declinations: product, process, technological and socio organisational.

In this regard, they come to prominence, among other things, **decision support systems** for irrigation management; **wireless sensor networks** for monitoring agrometeorology; **remotely piloted aircraft** coupled with sensors; **imagery satellite**; **open-source geographic information systems**.
There are also developed innovative machinery and processes to produce **healthier and more sustainable food**; practices for **reuse derivatives** of some typically Mediterranean products; tools for **preventive diagnostics** of animal diseases; and technologies and techniques for **precision irrigation**.

As for the more appropriately organisational aspect, many Projects propose **innovative models of participation** to develop new governance of innovation, **open innovation**, actively involve **all stakeholders**, and obtain products and practices as much as possible usable at the **company level**.
In this regard, it recurs creating natural **innovation ecosystems**, i.e., living labs, models composite in which innovation is designed, developed, demonstrated, and disseminated. This confirms that co-creation experiences of innovation can be valuable tools for the recovery of the Mediterranean. Some Projects also seek to promote innovative models to the **marketing** level, exploiting, for example, e-commerce and procurement mechanisms Public.

PRIMA and alignment with international initiatives in the agricultural and food sectors

A strength of PRIMA, in addition to facing challenges, is its alignment with the leading initiatives in sustainability, research and innovation in the agri-food sector, carried out by important **international, regional, and European players**.

Firstly, PRIMA seeks to align with some **Sustainable Development Goals**, and specific targets set out in the **United Nations 2030 Agenda** of September 2015. It aims to work on **Goal 2, "To end hunger, achieve food security, improve nutrition and promote sustainable agriculture"**, and **Goal 6 ", Ensuring all the availability and sustainable management of water and sanitation facilities"**.
Under Objective 6, the Projects related to the Thematic area of management of water

resources affect, particularly the **targets 6.4**, related to increasing efficiency in using water to address water scarcity, and **6.5**, aimed at implementing integrated water management at all levels.

At the Euro-Mediterranean level, PRIMA is also active in the discussion promoted within the **Union for the Mediterranean** on the new strategic agenda for the region. PRIMA is at the centre of the debate on the implementation of the new guidelines and priority.
The ability to respond to the increasingly urgent challenges will be required with effective and resilient solutions, bringing a concrete benefit to the small economic operators, local communities, and territories, thus contributing to the region's recovery.

At the European level, the objectives of PRIMA are also importantly reflected in the **Common Agricultural Policy of the European Union (CAP)** for 2021-2027, which, after two years of transitional regulation, will take a formal launch on 1 January 2023. As known, the emphasis of the next CAP will be the achievement of results related, in particular, to the issues of **protecting the environment** and **adaptation to climate change** by the sector agricultural. Among the proposed novelties, there is the introduction of **ecological regimes**. As a result, European farmers will access additional subsidies by using **sustainable and resilient agricultural practices**.

Concerning Objective 2 of the SDGs, PRIMA has a significant impact directly on the achievement of **targets 2.3**, **2.4** and **2.5**, concerning respectively the need to double the agricultural productivity and the income of food producers on a small scale, the implementation of sustainable food production systems and resilient farming practices and, finally, genetic diversity seeds, cultivated plants, farmed and domestic animals, and related wild species.
In this sense, many Projects, especially those who insist on the thematic area concerning agricultural systems, are developing and, in some cases, experimenting, innovative, resilient farming practices and environmentally friendly, which can be adopted at a later stage also at the company level and on a larger scale.

Finally, it is worth mentioning the proximity of projects BEFORE to the **Strategy 'From producer to consumer' by the European Commission** on 20 May 2020, included in the European Union's recovery and sustainable growth plan of December 2019, the **Green Deal**.
The Strategy establishes **27 actions** to be taken implement by 2023, including legislation on reducing the use of pesticides, animal welfare and strengthening the position of producers within the supply chain, issues on which it focuses in a more or less direct way most of the PRIMA funded projects.
Among the lines of action envisaged in the Strategy, objectives such as pursuing food production stand out. **Sustainable and food security**, the **transition to healthy and sustainable feeding patterns**, **reduced use of fertilisers and pesticides**, and the **fight against food waste** are also present in PRIMA.
However, the alignment with the Strategy of the European Commission is not only in terms of actions and objectives. It extends to the centrality assigned in both initiatives to **research and innovation activities**, the **use of new technologies**, **new business models**, **data transfer and good practices**, and, last but not least, **cooperation international and scientific diplomacy**.

PRIMA is turning towards the themes and the approaches developed at the European level with the **five Missions** that the **new Horizon Europe Framework Programme** will characterise.

Data per participating States and Entities

ALGERIA

Budget
1.964.240 €

29 Research Units
of which **2 SME**

18 Projects
involve one or more
algerian Research Units

Projects per thematic area

2
TRUST
INTEL-IRRIS

12
SCALA-MEDI
MEDIBEES
4BIOLIVE
BiopestIcide
CHANGE-UP
DROMAMED
ECHINO-SAFE-MED
ISFERALDA
ProSmallAgriMed
PROSIT
SafeAgroBee
TRANSITION

4
MEDWHEALTH
GourMed
LAB4SUPPLY
ImPUISe

Entities		Research Units	Section I	Section II
	1	ANVREDET Agence Nationale de Valorisation des Résultats de la Recherche et du Développement Technologique		ProSmallAgriMed
École Nationale Supérieure Agronomique	2			DROMAMED
	3			LAB4SUPPLY
	4			PROSIT
Institute National de la Recherche Agronomique d'Algeria (INRA)	5		MEDWHEALTH	
	6			4BIOLIVE
	7			BiopestIcide
	8			CHANGE-UP
	9			ISFERALDA
	10			TRANSITION
University of Sciences and Technology of Oran “Mohamed Boudiaf”	11	Département d'Agronomie	SCALA-MEDI	
	12	Département de Génie Electrique et Electronique		ImPUISe
University of Biskra "Mohamed Khider"	13	Department of Agricultural Sciences		GourMed
	14			ISFERALDA

	15	Le Group Amour		ImPUISe
	16	M'hamed Bougara University of Boumerdès	MEDIBEES	
	17	Palm Compost		ISFERALDA
	18	TCHIMBO		ProSmallAgriMed
	19	Technical Institute of Breeding/ Tlemcen	SCALA-MEDI	
	20	Technological Institute for the Development of the Saharan Agriculture		ISFERALDA
	21	Université A. Ibnbadis Mostaganem		INTEL-IRRIS
	22	Université Badji-Mokhtar Annaba		ProSmallAgriMed
	23	Université de Batna		ISFERALDA
Université de Tizi-Ouzou	24	Faculté des Sciences Biologiques et des Sciences Agronomiques		LAB4SUPPLY
Université Oran 1	25	Laboratoire Informatique Industrielle et Réseaux		INTEL-IRRIS
University of Boumerdes	26	Department of Agronomy		SafeAgroBee
	27	University of Guelma	TRUST	
	28	University of Sciences and Technology of Oran “Mohamed Boudiaf”	SCALA-MEDI	
Ziane Achour University of Djelfa	29	Faculty of Nature and Life Sciences and Center Research in Agropastoralism		ECHINO-SAFE-MED

CYPRUS

Budget
300.432 €

8 Research Units
of which **4 SME**

5 Projects
involve one or more
cypriot Research Units

Projects per thematic area

4
MiDiVine
OPTIMUS PRIME
REVINE
SafeAgroBee

1
NEXUS-NESS

Entities	Research Units		Section I	Section II
Cyprus University of Technology	1			MiDiVine
	2			OPTIMUS PRIME
	3			REVINE
	4			SafeAgroBee
	5	XPRO Consulting Limited	NEXUS-NESS	
	6	Sustainability Metrics		MiDiVine
	7	Vasiliko Oinopoieio Kyperoundas Ltd		REVINE
	8	Vlassides Winery Ltd		REVINE

CROATIA

Budget
755.063 €

7 Research Units
of which **1 SME**

3 Projects
involve one or more
croatian Research Units

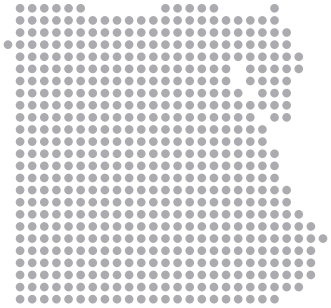
Projects per thematic area

1
SafeAgroBee

2
FLAT BREAD MINE
FunTomP

Entities		Research Units	Section I	Section II
University of Zagreb	1	Faculty of Food Technology and Biotechnology	FLAT BREAD MINE	
	2	Faculty of Food Technology and Biotechnology	FunTomP	
	3	Faculty of Electrical Engineering and Computing	FunTomP	
	4	Ruder Boskovic Institute	FunTomP	
	5	Kroštula Pekarnica	FLAT BREAD MINE	
University of J.J. Strossmayer in Osijek	6	Faculty of Agrobiotehnical Sciences		SafeAgroBee
University of Zadar	7	Department of Ecology, Agronomy and Aquaculture		SafeAgroBee

EGYPT



Budget
2.081.125 €

22 Research Units
of which **5 SME**

14 Projects
involve one or more
egyptian Research Units

Projects per thematic area

3
TALANOA-WATER
HANDYWATER
MED-WET

5
NEWFEED
MA4SURE
ReCROP
REVINE
TRANSITION

5
FLAT BREAD MINE
ImPUISe
LAB4SUPPLY
MED-LINKS
ORABBIT

1
NEXUS-NESS

Entities		Research Units	Section I	Section II
Heliopolis University for Sustainable Development	1		NEWFEED	
	2			MA4SURE
	3			MED-WET
	4			MED-LINKS
Alexandria University	5		NEXUS-NESS	
	6			ImPUISe
ISIS for Food Industries LTD	7		NEWFEED	
	8			MED-LINKS
Sekem Development Foundation	9		NEWFEED	
	10			MED-LINKS
Aal Shawky Farms	11			ImPUISe
Agricultural Research Center	12			REVINE
AgroMisr Company	13			ImPUISe
Animal Production Research	14			ORABBIT
Benha University	15			HANDYWATER
City of Scientific Research and Technological Applications	16			TRANSITION
Fayoum University	17	Faculty of Agriculture, Department of Soils and Water		ReCROP
Food Technology Research Institute	18		FLAT BREAD MINE	
Green Power for Agriculture and Irrigation	19		TALANOA-WATER	
Lotus for Organic Products	20			MA4SURE
National Water Research Centre	21		TALANOA-WATER	
Smartec Systems	22			LAB4SUPPLY

FRANCE

Budget
8.164.179 €

50 Research Units
of which **9 SME**

of which

31 Projects
involve one or more
french Research Units

4 Projects
are coordinated by
a french Research Unit

Projects per thematic area

6

MAGO
TALANOA-WATER
TRUST
DATI
INTEL-IRRIS
IRRIWELL

15

SCALA-MEDI
CHANGE-UP
DROMAMED
ECHINO-SAFE-MED
ISFERALDA
MA4SURE
MiDiVine
PROSIT
ProSmallAgriMed
ReCROP
REVINE
SafeAgroBee
SUSFORAGE
TRANSITION
UToPIQ

9

FLAT BREAD MINE
LOCALNUTLEG
AGRICOMPET
ImPUISe
LAB4SUPPLY
MED-LINKS
OIL4MED
ORABBIT
ValICET

1

NEXUS-NESS

Entities	Research Units	Section I	Section II
Agence Nationale de Sécurité Sanitaire de l'Alimentation, de l'Environnement et du Travail (ANSES)	1		ECHINO-SAFE-MED
Association Française d'Agroforesterie	2		TRANSITION
Burgundy School of Business	3		REVINE
Centre d'Ecologie Fonctionnelle et Evolutive	4		ReCROP
Centre International de Hautes Études Agronomiques Méditerranéennes	5	Institut Agronomique Mediterranéen de Montpellier, CIHEAM-IAMM	MED-LINKS
CESBIO Centre d'études Spatiales de la Biosphère	6		IRRIWELL
Copri SARL	7		ORABBIT
Ecophysiologie et Génomique Fonctionnelle de la Vigne	8		PROSIT
Excelia Business School	9		ImPUISe
French Agricultural Research Centre for International Development (CIRAD)	5		CHANGE-UP
French National Center for Scientific Research (CNRS)	11		CHANGE-UP

Génétique quantitative et Evolution - Le Moulon	12			DROMAMED
Institut d'écologie et des sciences de l'environnement de Paris	13			INTEL-IRRIS
Institut de Biosciences et Biotechnologies d'Aix-Marseille (BIAM-UMR 7265)	14			UToPIQ
Institut de l'Elevage	15		SCALA-MEDI	
Institut Européen des Membranes	16		TRUST	
Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement (INRAE)	17			IRRIWELL
	18	Occitanie-Toulouse Centre		ORABBIT
	19	Unité de recherche Écodévelo-ppement		TRANSITION
	20		MAGO	
	21		TALANOA-WATER	
	22	Biopolymères, Interactions, Assemblages (BIA-UR 1268)	FLAT BREAD MINE	
	23		SCALA-MEDI	
	24		LOCALNUTLEG	
	25			SUSFORAGE
	26			AGRICOMPET
La Mandorle	27		LOCALNUTLEG	
Laboratoire d'Hydrologie et de Géochimie de Strasbourg	28		TRUST	
Landfiles	29			TRANSITION
LISODE	30		MAGO	
Mediterranean Agronomic Institute of Montpellier	31	International Centre for Advanced Mediterranean Agronomic Studies		LAB4SUPPLY
MOISA Marchés, Organisations, Institutions et Stratégies d'Acteurs	32			ProSmallAgriMed
Oniris, Ecole Nationale Vétérinaire, Agroalimentaire et de l'alimentation de Nantes-Atlantique	33	GEPEA (UMR CNRS 6144)	FLAT BREAD MINE	
Qualiplante SAS	34			ProSmallAgriMed
QualiSud, Démarche intégrée pour l'obtention d'aliments de qualité	35			ProSmallAgriMed
Sol Agro et Hydrosystème Spatialisation	36		NEXUS-NESS	
SupAgro	37	UMR ITAP		DATI
Télécom SudParis	38			OIL4MED
Teriva	39		TRUST	
Université de Bordeaux	40			ValICET
Universite de Pau et des Pays de l'Adour	41	Laboratoire d'Informatique		INTEL-IRRIS
Université de Reims Champagne Ardenne	42	Groupe d'Etude des Géomatériaux et Environnements Naturels, Anthropiques et Archéologiques		ISFERALDA
	43	Laboratoire Résistance Induite et Bioprotection des Plantes		MiDiVine

Université Lyon 2	44			**ImPUISe**
Université Paris 1 Panthéon-Sorbone	45			**MA4SURE**
Université Paris-Saclay, CNRS, IRD	46	UMR- Évolution, Génomes, Compartement et Écologie, France		**SafeAgroBee**
University of Montpellier	47	Center for Environmental Economics		**ReCROP**
Valorex SA	48			**ORABBIT**
Vendée Mécanique Industrie	49		**FLAT BREAD MINE**	
YEC'HED MALT	50		**FLAT BREAD MINE**	

GERMANY

Budget
4.285.914 €

17 Research Units
of which **4 SME**

of which

13 Projects
involve one or more
german Research Units

3 Projects
are coordinated by
a german Research Unit

Projects per thematic area

4
HANDYWATER
INTEL-IRRIS
IRRIWELL
MED-WET

5
Biopesticides
DROMAMED
PROSIT
RESCHEDULE
SUSFORAGE

3
LOCALNUTLEG
GourMed
ImPUISe

1
NEXUS-NESS

Entities	Research Units	Section I	Section II
Helmholtz Centre for Environmental Research	1		RESCHEDULE
	2		HANDYWATER
ATB Leibniz-Institut für Agrartechnik und Bioökonomie eV	3		IRRIWELL
University Regensburg	4	Department of Cardiothoracic Surgery	Biopesticides
Technical University of Munich	5	Department of Chemistry	Biopesticides
DESIGN & DATA GmbH	6		NEXUS-NESS
Emporium Partners	7		ImPUISe
Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung eV	8		LOCALNUTLEG
Hochschule Wismar	9		MED-WET
Humboldt-Universität zu Berlin	10		SUSFORAGE
IAK Agrar Consulting GmbH	11		HANDYWATER
Institut für Energie- und Umweltforschung Heidelberg GmbH	12		GourMed
Leibniz-Institute of Plant Genetics and Crop Plant Research, IPK Gatersleben	13		DROMAMED
Max-Planck Institute for Molecular Plant Physiology	14		PROSIT
PerNaturam GmbH	15		Biopesticides
University of Duisburg-Essen	16	Centre for Logistics & Traffic	ImPUISe
WAZIUP eV	17		INTEL-IRRIS

JORDAN

Budget
836.750 €

5 Research Units
of which **1 SME**

4 Projects
involve one or more
jordan Research Units

Projects per thematic area

1 ACQUAOUNT

1 MEDIBEES

1 FLAT BREAD MINE

1 LENSES

Entities	Research Units	Section I	Section II
Facts-Center Scientific Food Center	1	FLAT BREAD MINE	
Jordanian Beekeepers Union	2	MEDIBEES	
National Agricultural Research Center (NARC)	3	ACQUAOUNT	
	4	MEDIBEES	
	5	LENSES	

GREECE

Budget
4.413.012 €

29 Research Units
of which **5 SME**

of which

18 Projects
involve one or more
greek Research Units

3 Projects
are coordinated by
a greek Research Unit

Projects per thematic area

3
ACQUAOUNT
MAGO
INTEL-IRRIS

8
NEWFEED
Biopesticides
ECHINO-SAFE-MED
ISFERALDA
OPTIMUS PRIME
RESCHEDULE
SafeAgroBee
TRANSITION

6
FLAT BREAD MINE
FunTomP
AGRICOMPET
GourMed
LAB4SUPPLY
MED-LINKS

1
LENSES

Entities		Research Units	Section I	Section II
Agricultural University of Athens	1			INTEL-IRRIS
	2			LAB4SUPPLY
Aristotle University of Thessaloniki	3	Biomics_AUTh	FunTomP	
	4			MED-LINKS
Centre for Research & Technology Hellas	5	Hellenic Institute of Transport		GourMed
Democritu University of Thrace	6			Biopesticides
Draxis Environmental SA	7		LENSES	
Edge in Earth Observation Sciences Monoprosopi Ike	8			TRANSITION
Ellinikos Georgikos Organismos - Dimitra	9		LENSES	
Federation of Hellenic Food Industries	10		NEWFEED	
Hellenic Agricultural Organization - Demeter	11		NEWFEED	
	12			ISFERALDA
	13	Veterinary Research Institute		ECHINO-SAFE-MED
	14	Department of Apiculture		SafeAgroBee
	15			AGRICOMPET
International Hellenic University	16		FLAT BREAD MINE	
	17			MED-LINKS
Mediterranean Information Office for Environment Culture and Sustainable Development	18	Institute for GWP-Med	ACQUAOUNT	
National Observatory of Athens	19			TRANSITION

National Technical University of Athens	20		NEWFEED	
Novacert	21			OPTIMUS PRIME
Technical University of Crete	22			RESCHEDULE
	23		LENSES	
TERRA SPATIUM SA	24			SafeAgroBee
University of Patras	25	Department of Environmental Engineering		Biopesticides
University of the Aegean	26	Department of Food Science and Nutrition		GourMed
University of Thessaly	27		MAGO	
University of Western Macedonia	28		NEWFEED	
ZenAgro PC	29			RESCHEDULE

ISRAEL

Budget
391.000 €

4 Research Units
of which **1 SME**

2 Projects
involve one or more
israeli Research Units

Projects per thematic area

1 LOCALNUTLEG

1 LENSES

Entities	Research Units	Section I	Section II
Agricultural Research Organization	1	LOCALNUTLEG	
MIGAL Galilee Research Institute Ltd	2	LENSES	
Tel-Hai Academic College	3	LOCALNUTLEG	
Yofix Probiotics Ltd	4	LOCALNUTLEG	

ITALY

Budget
16.130.505 €

84 Research Units
of which **17 SME**

of which

35 Projects
involve one or more
italian Research Units

16 Projects
are coordinated by
a italian Research Unit

Projects per thematic area

5

ACQUAOUNT
TALANOA-WATER
TRUST
DATI
HANDYWATER

18

MEDIBEES
SCALA-MEDI
SURFOLY
SUSTAvianFEED
4BIOLIVE
CHANGE-UP
DROMAMED
ECHINO-SAFE-MED
MA4SURE
OPTIMUS PRIME
PROSIT
ProSmallAgriMed
ReCROP
RESCHEDULE
REVINE
SafeAgroBee
TRANSITION
UToPIQ

10

FLAT BREAD MINE
FunTomP
LOCALNUTLEG
MEDWHEALTH
AGRICOMPET
GourMed
LAB4SUPPLY
MED-LINKS
ORABBIT
VallCET

2

LENSES
NEXUS-NESS

Entities		Research Units	Section I	Section II
Consiglio Nazionale delle Ricerche (CNR)	1	Istituto per la Tecnologia delle Membrane	TRUST	
	2	Istituto per la Protezione Sostenibile delle Piante	SCALA-MEDI	
	3	Istituto di Bioscienze e Biorisorse	FunTomP	
	4	Istituto di Ricerca sugli Ecosistemi Terrestri	MEDWHEALTH	
	5	Istituto di Ricerca sulle Acque	LENSES	
	6	Istituto per la Bioeconomia		DATI
	7	Istituto per la Protezione Sostenibile delle Piante		OPTIMUS PRIME
	8	Istituto di Bioscienze e Biorisorse		PROSIT
	9	Istituto di Ricerca sugli Ecosistemi Terrestri		ReCROP
	10	Istituto per la Protezione Sostenibile delle Piante		RESCHEDULE

Consiglio per la Ricerca in Agricoltura e l'analisi dell'Economia Agraria (CREA)	11	Centro di Ricerca Agricoltura e Ambiente	MEDIBEES	
	12	Centro di Ricerca Politiche Agricole e Bioeconomia	LENSES	
	13	Centro di Ricerca Ingegneria e Trasformazioni Agroalimentari		CHANGE-UP
	14	Centro di Ricerca Cerealicoltura e Colture Industriali		DROMAMED
	15	Centro di Ricerca per la cerealicoltura e le colture industriali		ProSmallAgriMed
	16	Centro di Ricerca Viticoltura ed Enologia		REVINE
	17	Centro di Zootecnia e Acquacoltura		ORABBIT
Fondazione Centro Euro-Mediterraneo sui Cambiamenti Climatici	18	Divisione IAFES, Impacts on Agriculture, Forests and Ecosystem Services c/o Dipartimento di Economia e Sistemi Arborei, Sezione Agrosistemi Arborei (Sassari)	ACQUAOUNT	
	19	Divisione ECIP, Economic Analysis of Climate Impacts and Policy Risk Assessment and Adaptation Strategies (Venezia)	TALANOA-WATER	
	20	Divisione IAFES, Impacts on Agriculture, Forests and Ecosystem Services (Viterbo)	SCALA-MEDI	
Università di Bologna	21	Dipartimento di Scienze e Tecnologie Agro-Alimentari		DROMAMED
	22	Dipartimento di Scienze e Tecnologie Agro-Alimentari		GourMed
	23	Dipartimento di Scienze e Tecnologie Agro-Alimentari		MED-LINKS
Università degli Studi di Milano	24	Dipartimento di Scienze per gli Alimenti, la Nutrizione e l'Ambiente	LOCALNUTLEG	
	25	Dipartimento di Bioscienze		PROSIT
	26	Dipartimento di Medicina Veterinaria		ORABBIT
Università degli Studi di Perugia	27	Dipartimento di Ingegneria Civile ed Ambientale	SURFOLY	
	28	Dipartimento di Ingegneria Civile ed Ambientale		4BIOLIVE
	29	Dipartimento di Scienze Agrarie, Alimentari ed Ambientali		ORABBIT
Nature 4.0, Soc. Benefit srl	30		ACQUAOUNT	
	31		SCALA-MEDI	
Terre Regionali Toscane	32			DATI
	33			MA4SURE
Università degli Studi di Firenze	34	Dipartimento di Ingegneria Civile e Ambientale	NEXUS-NESS	
	35	Dipartimento di Scienze e Tecnologie Agrarie, Alimentari Ambientali e Forestali		MA4SURE
Università degli Studi di Napoli Federico II	36	Dipartimento di Agraria		UToPIQ
	37	Dipartimento di Medicina Veterinaria e Produzioni Animali		ECHINO-SAFE-MED
Università degli Studi di Padova	38	Dipartimento Territorio e Sistemi Agro-Forestali	LENSES	
	39	Dipartimento di Biologia		PROSIT

ABINSULA srl	40		ACQUAOUNT	
ACME21 srl	41			SafeAgroBee
Agenzia Lucana di Sviluppo e di Innovazione in Agricoltura	42			OPTIMUS PRIME
Agenzia Regionale per la Ricerca in Agricoltura, AGRIS Sardegna	43		SCALA-MEDI	
Azienda Agricola San Marco ss	44			REVINE
Consorzio di Bonifica 6 Toscana Sud	45			DATI
Consorzio Nuove Varietà di Uve da Tavola	46			REVINE
CTI FoodTech srl	47			ValICET
Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile (ENEA)	48			REVINE
ERMES sas	49			REVINE
ETIFOR srl	50		LENSES	
F.lli Santorelli sas	51			ValICET
Fondazione Eni Enrico Mattei	52		NEXUS-NESS	
Fondazione Slow Food per la Biodiversità Onlus	53		SUSTAvianFEED	
Geographic Environmental COnsulting srl, GECOsistema	54		TALANOA-WATER	
HORTA srl	55			LAB4SUPPLY
IRRITEC spa	56			HANDYWATER
Istituto Zooprofilattico Sperimentale del Lazio e della Toscana M. Aleandri	57			ECHINO-SAFE-MED
La Semiorto Sementi srl	58			OPTIMUS PRIME
Libera Unversità di Bolzano	59	Facoltà di Economia		AGRICOMPET
MATARRESE srl	60		FLAT BREAD MINE	
Politecnico di Milano	61	Dipartimento di Ingegneria Civile e Ambientale	NEXUS-NESS	
ProdAI scarl	62			ValICET
Promolog srl	63		MEDWHEALTH	
Romagna Tech scpa	64			MED-LINKS
Società Agricola D'Alessandro ss	65			REVINE
Tecnologie per la Riduzione delle Emissioni Engineering srl	66		SURFOLY	
Università Cattolica del Sacro Cuore	67	Dipartimento di Scienze animali, della nutrizione e degli alimenti	SCALA-MEDI	
Università degli Studi di Bari Aldo Moro	68	Dipartimento di Scienze del Suolo, della Pianta e degli Alimenti	FLAT BREAD MINE	
Università degli Studi di Brescia	69	Dipartimento Medicina Molecolare e Traslazionale		SafeAgroBee
Università degli Studi di Cassino e del Lazio Meridionale	70	Dipartimento di Economia e Giurisprudenza		MED-LINKS
Università degli Studi di Catania	71	Dipartimento di Agricoltura, Alimentazione e Ambiente		HANDYWATER
	72	Dipartimento di Agricoltura, Alimentazione e Ambiente		TRANSITION

Università degli Studi di Sassari	73	Dipartimento di Scienze Agrarie e Veterinarie	ACQUAOUNT	
Università degli Studi di Torino	74	Dipartimento di Scienze Veterinarie	SUSTAvianFEED	
Università degli Studi della Tuscia	75	Dipartimento di Scienze Agrarie e Forestali	MEDWHEALTH	
Università degli Studi di Palermo	76	Dipartimento di Scienze Agrarie, Alimentari e Forestali		ProSmallAgriMed
Università degli Studi di Parma	77	Dipartimento di Scienze degli Alimenti e del Farmaco		CHANGE-UP
Università degli Studi di Verona	78	Dipartimento di Scienze Economiche		AGRICOMPET
Università del Piemonte Orientale Amedeo Avogadro	79	Dipartimento di Scienze e Innovazione Tecnologica		ProSmallAgriMed
Università della Calabria	80	Dipartimento di Ingegneria informatica, Modellistica, Elettronica e SIstemistica	TRUST	
Università per Stranieri di Perugia	81	Water Resources Research and Documentation Center	NEXUS-NESS	
Università Sant'Anna di Pisa	82	Istituto di Scienze della Vita	NEXUS-NESS	
Urby et Orbit srl	83		NEXUS-NESS	
Zini Prodotti Alimentari spa	84		LOCALNUTLEG	

LEBANON

Budget
2.403.862 €

13 Research Units

10 Projects
involve one or more
lebanese Research Units

Projects per thematic area

3
ACQUAOUNT
MAGO
TALANOA-WATER

4
MEDIBEES
SafeAgroBee
SURFOLY
SUSFORAGE

3
FLAT BREAD MINE
FunTomP
MEDWHEALTH

Entities		Research Units	Section I	Section II
American University of Beirut	1		FunTomP	
	2		MAGO	
	3		SURFOLY	
	4		TALANOA-WATER	
Crown Flour Mills	5		FLAT BREAD MINE	
ICARDA	6		MEDWHEALTH	
Lebanese Agricultural Research Institute	7		MEDWHEALTH	
	8		ACQUAOUNT	
	9			SafeAgroBee
Lebanese University	10	Faculty of Agriculture		SafeAgroBee
	11	Faculty of Agriculture	MEDIBEES	
Université Saint Joseph	12		FLAT BREAD MINE	
University of Balamand	13			SUSFORAGE

MALTA

Budget
774.812 €

5 Research Units
of which **1 SME**

3 Projects
involve one or more
maltese Research Units

Projects per thematic area

1
MED-WET

1
MEDIBEES

1
FLAT BREAD MINE

Entities	Research Units	Section I	Section II
FUNDING SUPPORT - MS Advisory Services Ltd	1	FLAT BREAD MINE	
Malta College of Arts, Science and Technology	2		MED-WET
Ministry for Agriculture, Fisheries and Animal Rights	3		MED-WET
University of Malta	4	FLAT BREAD MINE	
	5 Faculty of Medicine and Surgery	MEDIBEES	

MOROCCO

Budget
2.718.271 €

29 Research Units
of which **2 SME**

18 Projects
involve one or more
moroccan Research Units

Projects per thematic area

5
DATI
HANDYWATER
INTEL-IRRIS
IRRIWELL
MED-WET

9
SCALA-MEDI
SURFOLY
CHANGE-UP
DROMAMED
MiDiVine
OPTIMUS PRIME
ProSmallAgriMed
ReCROP
UToPIQ

4
LOCALNUTLEG
MEDWHEALTH
LAB4SUPPLY
MED-LINKS

Entities		Research Units	Section I	Section II
Alf Mabrouk	1		SURFOLY	
Association Nationale Ovine et Caprine	2		SCALA-MEDI	
Cactus Premium Sarl	3			ProSmallAgriMed
École Nationale d'Agriculture de Meknès	4			OPTIMUS PRIME
École nationale des sciences appliquées de Safi	5			INTEL-IRRIS
Université Hassan II de Casablanca	6	Faculté des Sciences et Techniques de Mohamedia		OPTIMUS PRIME
Université Mohammed I	7	Faculté Pluridisciplinaire de Nador		DATI
Ibn Zohr University	8			HANDYWATER
Institut National de la Recherche Agronomique	9		MEDWHEALTH	
	10		SCALA-MEDI	
	11			DROMAMED
	12			INTEL-IRRIS
	13			MED-WET
	14	Centre Régional de la Recherche Agronomique de Meknès		MiDiVine
	15			LAB4SUPPLY
Institut Agronomique et Vétérinaire Hassan II	16		SURFOLY	
	17			HANDYWATER

Université Cadi Ayyad	18	Laboratoire Aliments, Environnement et Santé, Faculté des Sciences et Techniques Guéliz		**ReCROP**
	19			**IRRIWELL**
	20			**MED-LINKS**
Moroccan Almond International	21		**LOCALNUTLEG**	
Moroccan Poultry Federation	22		**SCALA-MEDI**	
Observatory of the Marchica Lagoon of Nador	23			**UToPIQ**
Sultan Moulay Slimane University	24			**LAB4SUPPLY**
Université Abdelmalek Essaadi	25	Faculté polydisciplinaire de Larache		**CHANGE-UP**
Université Sidi Mohamed Ben Abdellah	26			**ProSmallAgriMed**
Université Sultan Moulay Sliman	27			**MED-WET**
University Chouaib Doukkali	28	Faculty of Sciences		**UToPIQ**
University of Moulay Ismail	29			**MED-LINKS**

PORTUGAL

Budget
1.802.899 €

21 Research Units
of which **2 SME**

of which

13 Projects
involve one or more
portuguese Research Units

1 Project
is coordinated by
a portuguese Research Unit

Projects per thematic area

2
DATI
MED-WET

6
MEDIBEES
DROMAMED
MiDiVine
ReCROP
RESCHEDULE
REVINE

5
FLAT BREAD MINE
FunTomP
LOCALNUTLEG
OIL4MED
ValICET

Entities		Research Units	Section I	Section II
Associação Desenvolvimento da Viticultura Duriense	1			ReCROP
AVIPE - Associação de viticultores do concelho de palmella	2			REVINE
Centro de Investigação de Montanha	3		MEDIBEES	
	4	Collaborative Laboratory Mountains of Research	LOCALNUTLEG	
FCiências.ID - Associação para a Investigação e Desenvolvimento de Ciências	5	Research centers: Biosystems and Integrative Sciences Institute (BioISI)/ Marine and Environmental Sciences center (MARE)		REVINE
	6			MiDiVine
INIAV - Instituto Nacional de Investigação Agrária e Veterinária IP	7			REVINE
	8			ValICET
Instituto para o Desenvolvimento Agrário da Região Norte	9			ReCROP
Instituto Politécnico de Bragança	10		LOCALNUTLEG	
Universidade de Lisboa	11	Instituto Superior de Agronomia		OIL4MED
Universidade Beira Interior	12			MED-WET
Município do Fundão	13			MED-WET
SOGRAPE VINHOS SA	14			MiDiVine
Sortegel-Produtos Congelados SA	15		LOCALNUTLEG	
Universidade Católica Portuguesa	16			ReCROP
Universidade Nova de Lisboa	17			DROMAMED
University of Algarve	18		FunTomP	
University of Évora	19			RESCHEDULE
University of Trás-os-Montes and Alto Douro	20			DATI
RAMALHOS	21		FLAT BREAD MINE	

SLOVENIA

Budget
160.000 €

4 Research Units

3 Projects
involve one or more
slovene Research Units

Projects per thematic area

3

MA4SURE
SafeAgroBee
SUSFORAGE

Entities	Research Units	Section I	Section II
Agricultural Institute of Slovenia	1		**SUSFORAGE**
	2 Dept of Animal production		**SafeAgroBee**
National Institute of Biology	3		**SafeAgroBee**
Slovenian Forestry Institute	4		**MA4SURE**

SPAIN

Budget
9.885.823 €

54 Research Units
of which **11 SME**

of which

28 Projects
involve one or more
spanish Research Units

18 Projects
are coordinated by
a spanish Research Unit

Projects per thematic area

7

ACQUAOUNT
MAGO
TALANOA-WATER
TRUST
DATI
HANDYWATER
IRRIWELL

12

MEDIBEES
NEWFEED
SUSTAvianFEED
4BIOLIVE
DROMAMED
MA4SURE
MiDiVine
OPTIMUS PRIME
ReCROP
SUSFORAGE
TRANSITION
UToPIQ

7

FLAT BREAD MINE
FunTomP
LOCALNUTLEG
AGRICOMPET
LAB4SUPPLY
OIL4MED
ValICET

2

LENSES
NEXUS-NESS

Entities	Research Units	Section I	Section II
AgriSat Iberia SI	1	LENSES	
Aigües de Barcelona, Empresa Metropolitana de Gestió del Cicle Integral de l'Aigua SA	2	MAGO	
ALIA Sociedad Agraria De Transformacion 2439	3	SUSTAvianFEED	
Àrea Metropolitana de Barcelona (AMB)	4	MAGO	
Asdron Spain SL	5		HANDYWATER
Asociación de Investigacion de la Industria del Juguete Conexas y Afines (AIJU)	6	FunTomP	
BIOGENETICS SL	7		ReCROP
Bodegas Baigorri SAU	8	NEWFEED	
Centre de Ciència i Tecnologia Forestal de Catalunya	9		SUSFORAGE
CETAQUA Centro Tecnológico del Agua	10	MAGO	

Confederación Española de Fabricantes de Piensos Compuestos para Animales	11		NEWFEED	
Consejo Superior de Investigaciones Científicas (CSIC)	12			DROMAMED
	13			UToPIQ
	14	Institute of Agricultural Sciences		DATI
	15		MAGO	
	16			ReCROP
	17	Instituto de Agroquímica y Tecnología de Alimentos	FLAT BREAD MINE	
	18	Instituto de Recursos Naturales y Agrobiologia de Sevilla		IRRIWELL
Conserves Ferrer SA	19		LOCALNUTLEG	
CREDA Centre de Recerca en Economia Desenvolupament Agroalimentari	20			LAB4SUPPLY
ECOADAPT	21		LENSES	
Ecological and Forestry Applications Research Centre	22			SUSFORAGE
ENTOMO Consulting SL	23		SUSTAvianFEED	
Forest Science and Technology Centre of Catalonia	24			TRANSITION
Fundació Eurecat	25		ACQUAOUNT	
Fundació Universitària Balmes, Universidad de Vic - Universidad Central de Catalunya	26			TRANSITION
Fundación AZTI	27		NEWFEED	
GRAMONA	28			MA4SURE
Grupo BIMBO	29		FLAT BREAD MINE	
Icatalist	30		TRUST	
Institut d'Estudis Regionals i Metropolitans de Barcelona	31			MA4SURE
Institut de Recerca i Tecnologia Agroalimentaries (IRTA)	32		LOCALNUTLEG	
Institute of Grapevine and Wine Science-La Rioja Government (ICVV)	33			MiDiVine
Instituto Andaluz de Investigación y Formación Agraria, Pesquera, Alimentaria y de la Producción Ecológica	34			OIL4MED
Instituto Regional de Investigación y Desarrollo Agroalimentario y Forestal de Castilla-La Mancha	35	Centro de Investigación Apícola y Agroambiental de Marchamalo	MEDIBEES	
Instituto Valenciano de Investigaciones Agrarias	36			HANDYWATER
Lomartov SL	37		FunTomP	
NEIKER Institute for Agricultural Research and Development	38			ReCROP
	39		NEWFEED	
Riera Nadeu SA	40		NEWFEED	
Unió Nuts	41		LOCALNUTLEG	

Unión Agroganadera de Álava	42		NEWFEED	
Universidad de Oviedo	43			AGRICOMPET
Universidad de Salamanca	44		TALANOA-WATER	
Universidad de Santiago de Compostela	45			ValICET
Universidad Politécnica de Madrid	46		NEXUS-NESS	
Universidade de Vigo	47			DROMAMED
Universitat de València	48	Institute for Local Development (ILD-WATER)	TRUST	
Universitat Jaume I	49			OPTIMUS PRIME
Universitat Politècnica de Catalunya	50			4BIOLIVE
	51		LOCALNUTLEG	
University of La Rioj	52			AGRICOMPET
University of Murcia	53		SUSTAvianFEED	
VerdeSmart	54			IRRIWELL

TUNISIA

Budget
3.780.474 €

42 Research Units
of which **6 SME**

26 Projects
involve one or more
tunisian Research Units

Projects per thematic area

5
ACQUAOUNT
MAGO
TALANOA-WATER
TRUST
IRRIWELL

13
SCALA-MEDI
SUSTAvianFEED
4BIOLIVE
Biopesticides
CHANGE-UP
DROMAMED
ECHINO-SAFE-MED
ISFERALDA
MiDiVine
ProSmallAgriMed
ReCROP
RESCHEDULE
REVINE

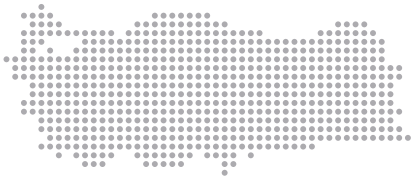
7
FunTomP
MEDWHEALTH
GourMed
ImPUISe
OIL4MED
ORABBIT
ValICET

1
NEXUS-NESS

Entities	Research Units	Section I	Section II
Association Rayhana pour femmes de Jendouba	1	SUSTAvianFEED	
Carthage University	2 Higher School of Agriculture of Mateur		ORABBIT
Center of Biotechnology of Borj-Cedria	3 Laboratory of Molecular Physiology of Plants		Biopesticides
	4		RESCHEDULE
Chahbani Technologies SA	5	MAGO	
Commissariat Régional au Développement Agricole	6	NEXUS-NESS	
Ecole Nationale de Médecine Vétérinaire	7		ORABBIT
Ezzayra Solutions ES	8	MAGO	
Frigo Al Habib	9		ImPUISe
Graines et Saveurs	10		ValICET
Groupement Interprofessionnel des Produits Avicoles et Cunicoles (GIPAC)	11		ORABBIT
High School of Agriculture of Mateur	12	SCALA-MEDI	
Institut de l'Olivier	13		OIL4MED
	14		IRRIWELL

Institut des Régions Arides	15		ACQUAOUNT	
	16		NEXUS-NESS	
	17			ISFERALDA
Institut National Agronomique de Tunisia (INAT)	18			DROMAMED
	19			ProSmallAgriMed
	20			ReCROP
	21		TALANOA-WATER	
	22		SCALA-MEDI	
Institut National de la Recherche Agronomique de Tunisia (INRAT)	23			MiDiVine
	24			CHANGE-UP
	25		MEDWHEALTH	
Institut National de Recherche et d'Analyse Physico-chimique	26			ValICET
Institut National de Recherches en Génie Rural, Eaux et Forêts	27		MAGO	
Institut Supérieur de Biotechnologie de Monastir	28			GourMed
International Greenway Trading Co.	29			ImPUISe
Karray International Trading	30			ImPUISe
National Genebank of Tunisia	31		SCALA-MEDI	
Office de Développement Sylvo Pastoral du Nord Oues	32		SCALA-MEDI	
Centre Régional des Recherches Agricoles Sidi Bouzid	33			REVINE
Regional Research Centre on Horticulture and Organic Agriculture, CRRHAB/IRESA	34			4BIOLIVE
Université de la Manouba	35	École nationale de médecine vétérinaire de Sidi Thabet		ECHINO-SAFE-MED
University of Carthage	36		TRUST	
University of Monastir	37	Institut Supérieur des Etudes appliqués en Humanité Mahdia, ISEAH / UM		4BIOLIVE
University of Sfax	38	High Institute of Biotechnology	FunTomP	
	39		TRUST	
	40			ImPUISe
University of Sousse	41	Higher Institute of Agricultural Sciences of Chott Mariem	SUSTAvianFEED	
	42			OIL4MED

TURKEY



Budget
3.332.994 €

26 Research Units
of which **4 SME**

of which

13 Projects
involve one or more
turkish Research Units

1 Project
is coordinated by
a turkish Research Unit

Projects per thematic area

1
TRUST

6
MEDIBEES
NEWFEED
SUSTAvianFEED
Biopesticides
DROMAMED
OPTIMUS PRIME

5
FunTomP
LOCALNUTLEG
MEDWHEALTH
AGRICOMPET
ImPUISe

1
LENSES

Entities	Research Units		Section I	Section II
Ankara University	1			Biopesticides
ASSAN Foods	2		FunTomP	
Bati Akdeniz Agricultural Research Institute	3			DROMAMED
Bogazici University	4			AGRICOMPET
Bursa Uludağ Üniversitesi	5	Department of Food Engineering	LOCALNUTLEG	
Bursa Technical University	6			Biopesticides
Dokuz Eylül University	7		TRUST	
EA-TEK International R&D, Engineering, Software and Consultancy Company	8		LENSES	
Ege Üniversitesi	9		TRUST	
	10		FunTomP	
	11		SUSTAvianFEED	
	12			OPTIMUS PRIME
International Agricultural Research and Training Center	13		LENSES	
Istinye University	14		MEDWHEALTH	
Izmir Institute of Technology	15		LOCALNUTLEG	
Koç University	16			ImPUISe
Middle East Technical University	17	Department of Food Engineering	FunTomP	
	18		NEWFEED	
SELUZ Fragrances & Flavour	19		FunTomP	
Turkish Accelerator and Radiation Laboratory	20		FunTomP	

University of Namik Kemal	21	**MEDIBEES**	
Unpa Pastaneleri	22	**LOCALNUTLEG**	
Urla Women Entrepreneurship Production and Management Cooperative	23	**LOCALNUTLEG**	
Van Yüzüncü Yil University	24	**TRUST**	
	25	**FunTomP**	
Yenigun Gida	26		**ImPUISe**

Funded Project 2020

Section I

Project sheets follow the order by Thematic Area
(Water management; Agricultural systems; Agri-food value chain; Nexus)

Thematic Area

Water Management

Section I

Topic - Implementing sustainable, integrated management of water resources in the Mediterranean, under climate change conditions

Action

IA - Innovation Action

Budget

2.474.006 €

Duration

48 months

State and Coordinator Entity

ITALY

Fondazione Centro Euro-Mediterraneo sui Cambiamenti Climatici, Divisione IAFES, Impacts on Agriculture, Forests and Ecosystem Services

Scientific Officer: MEREU, Simone

Participating States/ 6

Research Units/ 9

Section I

1. ACQUAOUNT

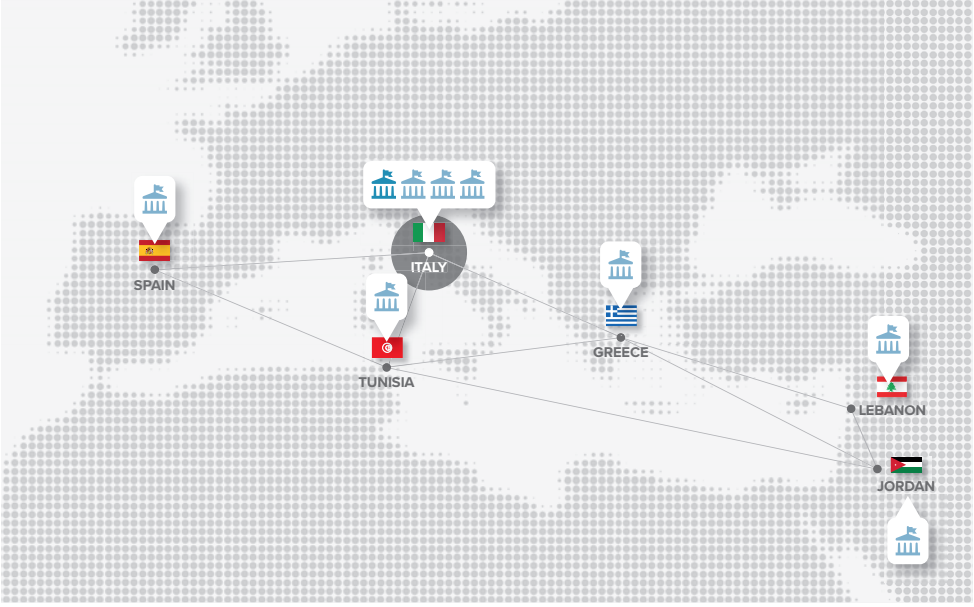
Adapting to Climate change by QUantifying optimal Allocation of resOUrces and socio-ecoNomic inTerlinkages

Context

Due to the increasing competition for good-quality water among different sectors, water availability for agriculture is declining, especially in water-scarce MED countries that will require new solutions to narrow the gap between freshwater demand & supply. Agriculture is by far the most water demanding sector in the Mediterranean. Combined with economic growth, sustainable use of water cannot be achieved without improving irrigation efficiency and water productivity. In this historical moment, with national economies dampened by the COVID-19 pandemic, investments in the water sector would be a powerful instrument to reboot the economy while accelerating advancements towards Sustainable Development Goals (SDGs). Goals must not be put aside as climate projections assess a decrease in water supplies and increased water demand for agriculture in the Mediterranean because of climate change (CC) and population growth. The current heavy depletion of water sources leads to water scarcity and degradation, deterioration of ecosystem services, conflicts with domestic and industrial uses, and, in general, poses limitations to economic growth. These trends will be exacerbated by CC. Digitalization of the water sector is considered a crucial strategic step in attaining a sustainable IWRM.

Objective and contents

The ACQUAOUNT project aims to improve IWRM and sustainable irrigation by deploying innovative tools, smart water services and solutions, for public and private use while contributing to climate resilience. ACQUAOUNT will develop a suite of creative tools covering monitoring and control (IoT), interoperability and standardization (WoT), efficient operation and recommendations for water and production efficiency (weather and complex dynamic modelling tools combined with data analytics and a decision-support tool) and innovative visualization and data exploration (KPIs-based visualization). These tools will simulate complex interactions and feedback across several time horizons and multiple related environmental and socio-economic dimensions, leading to policy recommendations and CC adaptation strategies.



Other Entities/ 8

Università degli Studi di Sassari, Dipartimento di Scienze Agrarie e Veterinarie, Italy
Scientific Officer: MARRAS, Serena

Nature 4.0, Soc. Benefit srl, Italy
Scientific Officer: VALENTINI, Riccardo

ABINSULA srl, Italy
Scientific Officer: SOLINAS, Antonio

Fundació Eurecat, Spain
Scientific Officer:
AITOR, Corchero Rodriguez

Mediterranean Information Office for Environment Culture and Sustainable Development (as host Institute for GWP-Med), Greece
Scientific Officer: TOLI, Konstantina

National Agricultural Research Center (NARC), Jordan
Scientific Officer: MAZAHRIH, Naem

Lebanese Agriculture Research Institute, Lebanon
Scientific Officer: JOMAA, Ihab

Institut des Regions Arides, Tunisia
Scientific Officer: NAGAZ, Kamel

These innovations will be demonstrated at a large scale in basins of four Mediterranean countries (Italy, Jordan, Lebanon, and Tunisia), where water efficiency is a must to cope with water scarcity and climate change.

Expected impact and results

ACQUAOUNT will support partner countries in adopting those measures necessary to improve digital devices that can be used in the water and agriculture sectors. The Web of Thing Platform (WoT) will provide a series of standardized services and methodologies to different end-users, allowing the exchange of information between other actors to ensure decision-making processes based on a holistic vision of the system to improve the governance of the Integrated Water Resource Management (IWRM). It is expected that the tools developed in ACQUAOUNT will support the monitoring of progress toward the targets of the UN SDGs 2030 for freshwaters (i.e., SDG 6), economic development (i.e., SDG 8), resilient and sustainable communities (i.e., SDG 11), climate change (i.e., SDG 13) and engender progress in the Degree of Implementation of IWRM (SDG 6.5.1). The project will provide non-profit and profit-oriented business models scaled up across the Mediterranean with a long-term vision and future sustainability. ACQUAOUNT will offer policy recommendations for different stakeholders and tools for farmers to improve water management capacities and adaptation strategies.

SPECIFIC OBJECTIVES

The WoT platform provides two real-time services:

- a service for farmers for optimal irrigation and scheduling accounting for crop type and agricultural practices,
- a service for water managers for real-time monitoring and seasonal projections of water demands and supplies able to alert multiple actors in case of criticalities.

Finally, is used to provide a Decision Support Tool

- for long-term planning and development of CC adaptation strategies by comparing results of simulation under alternative development scenarios as new infrastructures for use of recycled water, agricultural practices and policies.

Thematic Area

Water Management

Section I

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

Action

IA - Research & Innovation Action

Budget

2.495.500 €

Duration

48 months

State and Coordinator Entity

SPAIN

Centro Tecnológico del Agua

CETAQUA
CENTRO TECNOLÓGICO DEL AGUA

Scientific Officer: POUGET, Laurent

Participating States/ 5

Research Units/ 11

Section I

2. MAGO

Mediterranean wAter management solutions for a sustainable aGriculture supplied by an Online collaborative platform

Context

Food security and water management in the Mediterranean Region are challenged by reduced water availability due to climate change, directly affecting agricultural production and the increasing population, stressing the demand for water and food. While compelling technologies exist to improve the performance and resilience of water systems, progress has been slow in practice2. One significant difficulty is the disconnection between research results with real market needs and end-users demand (i.e., “best science in the world” instead of “best science for the world”). The MAGO project will connect by addressing critical innovation diffusion and adoption (e.g., social and political issues, need for affordable solutions, capacity building and new business models).

Objective and contents

MAGO will demonstrate novel solutions to enhance integrated water resources management (IWRM) for the Mediterranean region’s sustainable agriculture. These solutions will boost water use efficiency in agriculture, alternative water resources and climate change adaptation (CCA). They will be demonstrated in Tunisia, Spain, France, and Lebanon. These solutions will build upon (1) a novel participatory approach with end-users and stakeholders and (2) a new online collaborative platform for researchers and entrepreneurs for delivering web applications.

Specifically, Aigües de Barcelona will contribute to the implementation of risk management strategies in the Barcelona Living Lab. In this same experimental environment, the CSIC team, led by Miren López de Alda, research scientist at the Institute of Environmental Assessment and Water Research (IDAEA) in Barcelona, is responsible for the evaluation of emerging contaminants and the analysis of risks associated with the reuse of wastewater in agriculture. The participation of the Barcelona Metropolitan Area is part of the development of this living lab to promote the use of reclaimed water from the Gavà-Viladecans Waterwaste Treatment Plan (WWTP) in an area that must combine the development of agricultural activity with the preservation of a nat-

Other Entities/ 10

Aigües de Barcelona, Empresa Metropolitana de Gestió del Cicle Integral de l'Aigua SA, Spain
Scientific Officer: BALSEIRO, Catalina

Àrea Metropolitana de Barcelona (AMB), Spain
Scientific Officer:
ACEVES TORRENTS, Mercè

Agencia Estatal Consejo Superior de Investigaciones Científicas (CSIC), Spain
Scientific Officer:
LOPEZ DE ALDA VILLAIZAN, Miren

LISODE, France
Scientific Officer: DIONNET, Mathieu

Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement, (INRAE), France
Scientific Officer:
SERRA-WITTLING, Claire

University of Thessaly, Greece
Scientific Officer: LASPIDOU, Chrysi

American University of Beirut, Lebanon
Scientific Officer: MOHTAR, Rabi

Chahbani Technologies SA, Tunisia
Scientific Officer: CHAHBANI, Wassim

Institut National de Recherches en Génie Rural, Eaux et Forêts, Tunisia
Scientific Officer: YACOUBI, Samir

Ezzayra Solutions ES, Tunisia
Scientific Officer: BOUOUD, Yasser

ural area of great environmental interest. To this purpose, it has the collaboration of the Consorci del Parc Agrari del Baix Llobregat, in collaboration with the agricultural sector and other stakeholders, to develop solutions to improve the management of reclaimed water and governance.

Cetaqua, in its mission to increase the sustainability and resilience of Mediterranean water systems, will be in charge of leading the project activity. Its itexperience in the development of smart solutions, based on the use of open data and satellite images to improve water efficiency, will allow it to coordinate the development of web applications and APIs.

Expected impact and results

The project will develop 1) Novel participatory processes for better water and innovation governance, for a better dialogue between researcher and end-users in the Mediterranean region, 2) Enhanced monitoring and modelling solutions for better water use efficiency and soil conservation, 3) Improved planning and operation of wastewater reuse systems in agriculture to increase wastewater reuse volume in the Mediterranean region, 4) new solutions for Global Change adaptation, with the creation of operational solutions for end-users and update of planning strategies for decision-makers, 5) Novel collaborative platform to deliver web applications4 for Mediterranean region.

SPECIFIC OBJECTIVES

- This collaborative project will demonstrate novel solutions to enhance integrated water resources management for a sustainable agriculture in the Mediterranean Region;
- These solutions will build upon a novel participatory approach with end-users and stakeholders and a new online collaborative platform for researchers and entrepreneurs for delivering web applications;
- These solutions, which will be demonstrated in Tunisia, Spain, France and Lebanon, will boost water use efficiency in agriculture, the use of alternative water resources and climate change adaptation (CCA).

Thematic Area

Water Management

Section I

Topic - Implementing sustainable, integrated management of water resources in the Mediterranean, under climate change conditions

Action

IA - Innovation Action

Budget

2.500.000 €

Duration

48 months

State and Coordinator Entity

SPAIN

Universidad de Salamanca

Scientific Officer:
PEREZ-BLANCO, Carlos Dionisio

Participating States/ 6

Research Units/ 8

Section I

3. TALANOA-WATER

Talanoa Water Dialogue for Transformational Adaptation to Water Scarcity Under Climate Change

Context

Water crises are the most significant global societal risk of potential impact (WEF, 2020). If we keep using water now, global water demand could exceed supply by 40% by 2030, decreasing GDP growth in water-stressed areas by 6%. This is comparable to the expected yearly average economic slowdown induced by the COVID-19 in some of the worst-hit economies during 2020-2021; only in the case of water scarcity, the impact will continue. Avoiding this “misery in slow motion” calls for transformational adaptation, i.e., systemic (much larger scale) and/or paradigm shifts (genuinely new to a particular location) that integrate adaptation to climate change with the coordinated development and management of water, land and related resources, driven by technological and management improvements and informed by cutting-edge science.

Objective and contents

The objective of TALANOA-WATER is to inform and catalyze the adoption of robust transformational adaptation strategies to water scarcity under climate change that contributes to the Integrated Water Resources Management (IWRM) objectives of social equity, economic efficiency and environmental sustainability. TALANOA-WATER will develop a groundbreaking ecosystem of innovation that combines an inclusive and transparent stakeholder engagement method, the Talanoa Dialogue, with an actionable modelling framework inspired in interdisciplinary socio-hydrology science so to design, realize and demonstrate the performance of transformational adaptation strategies at various levels (from farm to basin, from user to the economic sector) in six large-scale ‘pilot water laboratories’. TALANOA-WATER will explore transformational adaptation strategies that combine complementary and mutually reinforcing nature-based solutions, technological innovation and climate/water services, risk management and financing instruments and economic and behavioural.

Other Entities/ 7

National Water Research Centre, Egypt
Scientific Officer: SHEHATA, Abdrabbo

Green Power for Agriculture and Irrigation, Egypt
Scientific Officer: KHALID, Omar

Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement, (INRAE), France
Scientific Officer: GRAVELINE, Nina

Fondazione Centro Euro-Mediterraneo sui Cambiamenti Climatici, Divisione ECIP, Economic Analysis of Climate Impacts and Policy Risk Assessment and Adaptation Strategies, Italy
Scientific Officer: MYSIAK, Jaroslav

Geographic Environmental COnsulting srl, GECOsistema, Italy
Scientific Officer: BAGLI, Stefano

American University of Beirut, Lebanon
Scientific Officer: JAAFAR, Hadi

Institut National Agronomique de Tunisia (INAT), Tunisia
Scientific Officer: NOUIRI, Issam

Expected impact and results

TALANOA-WATER fields a groundbreaking ecosystem of innovation that combines an inclusive and transparent stakeholder engagement method, the Talanoa Dialogue, with an actionable modelling framework inspired in interdisciplinary socio-hydrology science to share views, develop collective knowledge, build trust, achieve consensus and unblock transformational responses to water scarcity under climate change in six large-scale pilot water laboratories in the Mediterranean basin. In the TALANOA-WATER ecosystem of innovation, stakeholders are an integral part of the research, contributing alongside scientists. They do this through the co-design, co-development, co-evaluation, co-identification and co-implementation phases to generate a personalized experience to a level that is best suited for their tasks (e.g., decision-making). This co-opting users' competence denotes efforts through which stakeholders: 1) are turned into co-creators and not only 'customers' of research outputs; 2) assume roles in shaping expectation and acceptance of scenarios and strategies, and 3) help to extract the value of the modelling framework and ecosystem of innovation, and actively contribute to the deployment of agreed transformational adaptation strategies. Fluent science-policy interaction and collaboration within the innovation ecosystem thus become the hub for value creation and extraction through the design, realization and demonstration of complementary and mutually reinforcing technologies and management options in comprehensive transformational adaptation strategies.

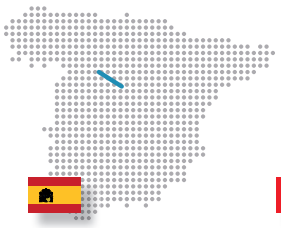
SPECIFIC OBJECTIVES

- Nature-based solutions (e.g. natural water retention);
- Technological innovation and climate/water services (e.g. non-traditional water sources, irrigation services advising the timing and intensity of irrigation and optimal protection of crops against extreme climate events);
- Risk management and financing instruments (e.g. payment for ecosystem services, insurance);
- Economic and behavioural incentives (e.g. water charges, water markets, voluntary agreements).

6 case studies

Lower Nile River Basin

Hérault Department



Cega Basin

Jeffara Basin

Upper Litani River Basin

Po River Basin

Thematic Area

Water Management

Section I

Topic - Implementing sustainable, integrated management of water resources in the Mediterranean, under climate change conditions

Action

IA - Innovation Action

Budget

1.985.000 €

Duration

36 months

State and Coordinator Entity

ITALY

Università della Calabria,
Dipartimento di Ingegneria informatica, Modellistica, Elettronica e SIstemistica

UNIVERSITÀ DELLA CALABRIA
DIPARTIMENTO DI INGEGNERIA INFORMATICA, MODELLISTICA, ELETTRONICA E SISTEMISTICA

Scientific Officer:
CALABRÒ, Vincenza

Participating States/ 6

Research Units/ 13

Section I

4. TRUST

Management of industrial Treated wastewater ReUse as mitigation measures to water Scarcity in climaTe change context in two Mediterranean regions

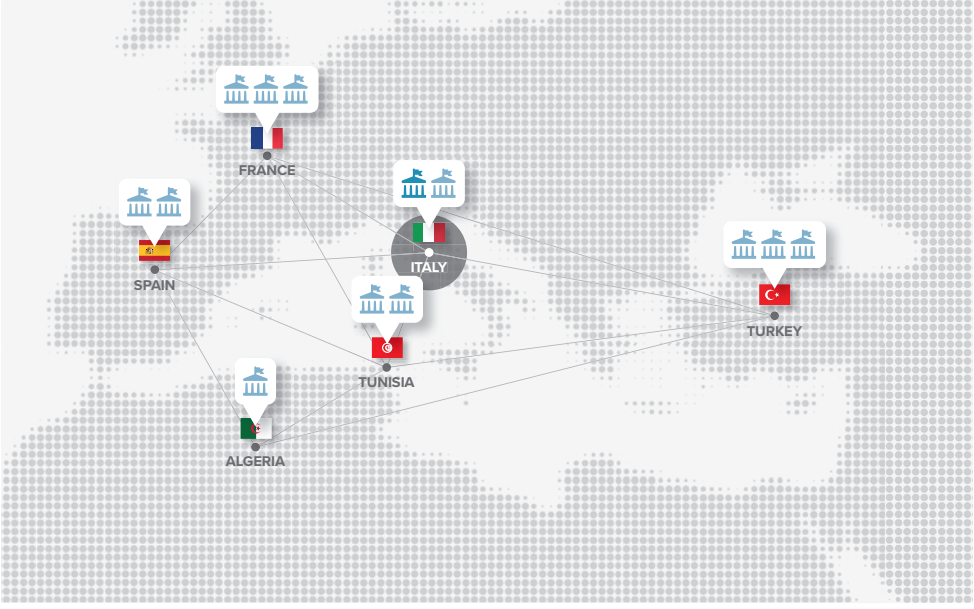
Context

TRUST will focus on challenging cases in terms of efficient wastewater treatment of the textile and pharmaceutical industries from Tunisia and Turkey where water scarcity is a major concern and irrigation is a large water-consuming sector. By implementing appropriate advanced treatment to achieve TRL 6-7, TRUST will not only reduce the environmental impact but also save water resources by allowing reuse after pollution control. Indeed, non-conventional water such as wastewater is currently only partially reused in these regions (about 20%) but appropriate treatment would generate a new source of clean water to be used and an opportunity to enhance water security. The impact on groundwater resources of the mitigation measure of water reuse will be modelled at the specific case study's local/regional scale by comparing scenarios including potential climate change in the medium and long term.
TRUST's water reuse strategy will also contribute reducing business instability by developing the market. In this perspective new business models will be developed according to site specific socio-economic and legal constraints and the economic assessment of the different water allocation ways will be performed.

Objective and contents

TRUST's specific objectives addressing the aforementioned challenges are:

- Provide novel, environmental and economic sustainable wastewater treatment solutions for challenging industrial wastewaters, applying a circular economy approach and in a synergic collaboration between technology providers, economists and LCA expert. Quantified targets of wastewater treatment performance and reuse, and valuable substances recovery at pilot level will be indicators of achieving the objective of economic and environmental efficiency of wastewater treatment. In addition, reduction in the unit cost of wastewater treatment with the new technology will be another indicator.
- Propose optimal management strategies based on reuse of water at multiple allocations levels, in partnership with water utilities, industries, local and regional water authorities including policymakers. The local and regional stakeholders in



Other Entities/ 12

Consiglio Nazionale delle Ricerche (CNR), Istituto per la Tecnologia delle Membrane, Italy
Scientific Officer: ALGIERI, Catia

University of Guelma, Algeria
Scientific Officer:
EL BERRICHI, Fatima Zora

Universitat de València, Institute for Local Development (ILD-WATER), Spain
Scientific Officer:
HERNÁNDEZ-SANCHO, Francesc

Icatalist, Spain
Scientific Officer: LOPEZ, Elena

Teriva, France
Scientific Officer: GHAZI, Malika

Institut Européen des Membranes, France
Scientific Officer: HERAN, Marc

Laboratoire d'Hydrologie et de Géochimie de Strasbourg, France
Scientific Officer: DUPLAY, Joelle

University of Sfax, Tunisia
Scientific Officer: BEN AMAR, Raja

University of Carthage, Tunisia
Scientific Officer: NOUIRI, Issam

Ege Üniversitesi, Turkey
Scientific Officer: ATALAY, Suheyda

Van Yüzüncü Yil University, Turkey
Scientific Officer: BAYLAN, Emel

Dokuz Eylül University, Turkey
Scientific Officer: SOMAY ALTAS, Melis

the countries of interest will be involved in a participatory approach. In addition, socio- economic partners will step in to ensure enhancing the implementation of European environmental strategies and policies at territorial and local levels.

- Present concrete scenarios highlighting the impact of water reuse and thus water resource saving in the light of climate change, taking into account the regional constraints identified by hydrologists and hydrogeologists. Indicators will be the achievement of hydrogeological models (3 per pilot project: SWAT, WEAP, MOD-FLOW), and of guidelines for regional water management bodies on treated waste-water.
- Identify business models based on a regional approach in order to contribute in sustainable resources management and sustainable business operations through saving of fresh water, reducing operating expenses and developing regional-scale facilities. Potential market and expected number of replicas of the project and ex-pected growth rate of industrial reclaimed water use will be indicators of achieving the objectives.

Expected impact and results

Water scarcity is not only ecological phenomena for the world, but it is also direct-ly related with economy, energy, industrial investments and social life. The use of wastewater is one of the most sustainable alternatives to cope with water shortage TRUST's expected added values from the technical solutions are multiple:

- to close the loop in case of water and valuable substances, for example, to allow water reuse allocation for different purposes (irrigation, in industrial process, in aquifer recharge); to use the recovered salt further in textile dyeing processes; to combine recovery/savings of valuable resources and energy,
- to enhance the use of chemicals with less environmental impacts while efficiently depolluting wastewaters, and
- to give clues to adapt these innovative treatment processes to other industries' wastewaters in a circular economy approach.

TRUST's implemented wastewater treatment technologies will consider the quality of the treated water to be reused and overall sustainability by applying Life Cycle and Life Cycle Costing Assessment tools.

Thematic Area

Farming Systems

Section I

Topic - Genetic conservation and animal feeds
Sub-topic A - Conservation and valorization of local Animal Genetic Resources

Action

RIA - Research & Innovation Action

Budget

1.750.000 €

Duration

48 months

State and Coordinator Entity

SPAIN

Instituto Regional de Investigación y Desarrollo Agroalimentario y Forestal de Castilla-La Mancha, Centro de Investigación Apícola y Agroambiental de Marchamalo

Castilla-La Mancha

Scientific Officer:
MARTIN HERNANDEZ, Raquel

Participating States/ 8

Research Units/ 9

Section I

5. MEDIBEES

Monitoring the Mediterranean Honey Bee subspecies and their resilience to climate change for the improvement of sustainable agro-ecosystems

Context

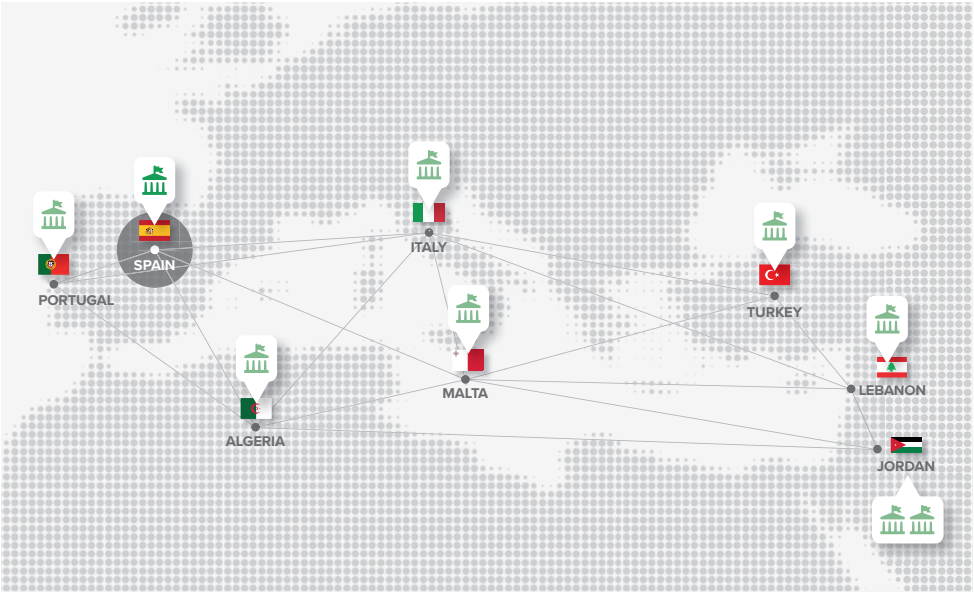
The honeybee is a human-managed insect playing a pivotal role in crop and wild plant pollination. Thanks to its activity, crops improve qualitatively and quantitatively, and plants protect themselves against pests. Approximately one-third of all plants or plant products consumed by humans and used for animal feeding depend directly or indirectly on bee pollination (FAO). Beekeeping also provides subsistence to hundreds of thousands of beekeepers in the Mediterranean area thanks to honey -a traditional ingredient of the Mediterranean diet-, pollen, wax, royal jelly, propolis, and apitoxin. Actions directed to the conservation of *Apis mellifera* subspecies in the Mediterranean are expected to promote the quantity and quality of crops, with an immediate increase in food availability. Climate change is expected to increase the bees' stress factors, especially in this region, reducing pollination efficiency and production potential. There is an incomplete understanding of the natural adaptation mechanisms developed by the different subspecies in the Mediterranean basin. So, basic knowledge is needed for future selection programs aiming to improve bee stocks for environmental changes.

Objective and contents

MEDIBEES aims to generate new knowledge on the genetics of bees and their adaptation to climate change, develop new genetic tools to promote the selection of climate change-resilient A. mellifera breeds, train beekeepers to use Good Management Practices and valorise beekeeping products and by-products.
The goals of the MEDIBEES project are:

1. Genetic mapping of A. mellifera, covering ten local subspecies, determines the genetic traits controlling their adaptation to heat, drought, ultraviolet exposure, and resistance to parasites/pathogens:

- Field and laboratory studies and determination of genetic differences between subspecies to determine the adaptation of honeybee subspecies to the stressors;
- Development of genetic tools for genetic characterisation of subspecies. Assessment of introgression between lineages;
- Transcriptomic analysis of genes related to resilience and implication in adaptation.



Other Entities/ 8

M'hamed Bougara University of Boumerdès, Algeria
Scientific Officer: ADJLANE, Noureddine

Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria (CREA), Centro di Ricerca Agricoltura e Ambiente
Scientific Officer: NANETTI, Antonio

National Agricultural Research Center (NARC), Jordan
Scientific Officer: HADDAD, Nizar

Jordanian Beekeepers Union, Jordan
Scientific Officer:
DAOUR, Ahmad Yousef

Lebanese University, Lebanon
Scientific Officer: HOSRI, Chadi

University of Malta, Malta
Scientific Officer:
ZAMMITT MANGION, Marion

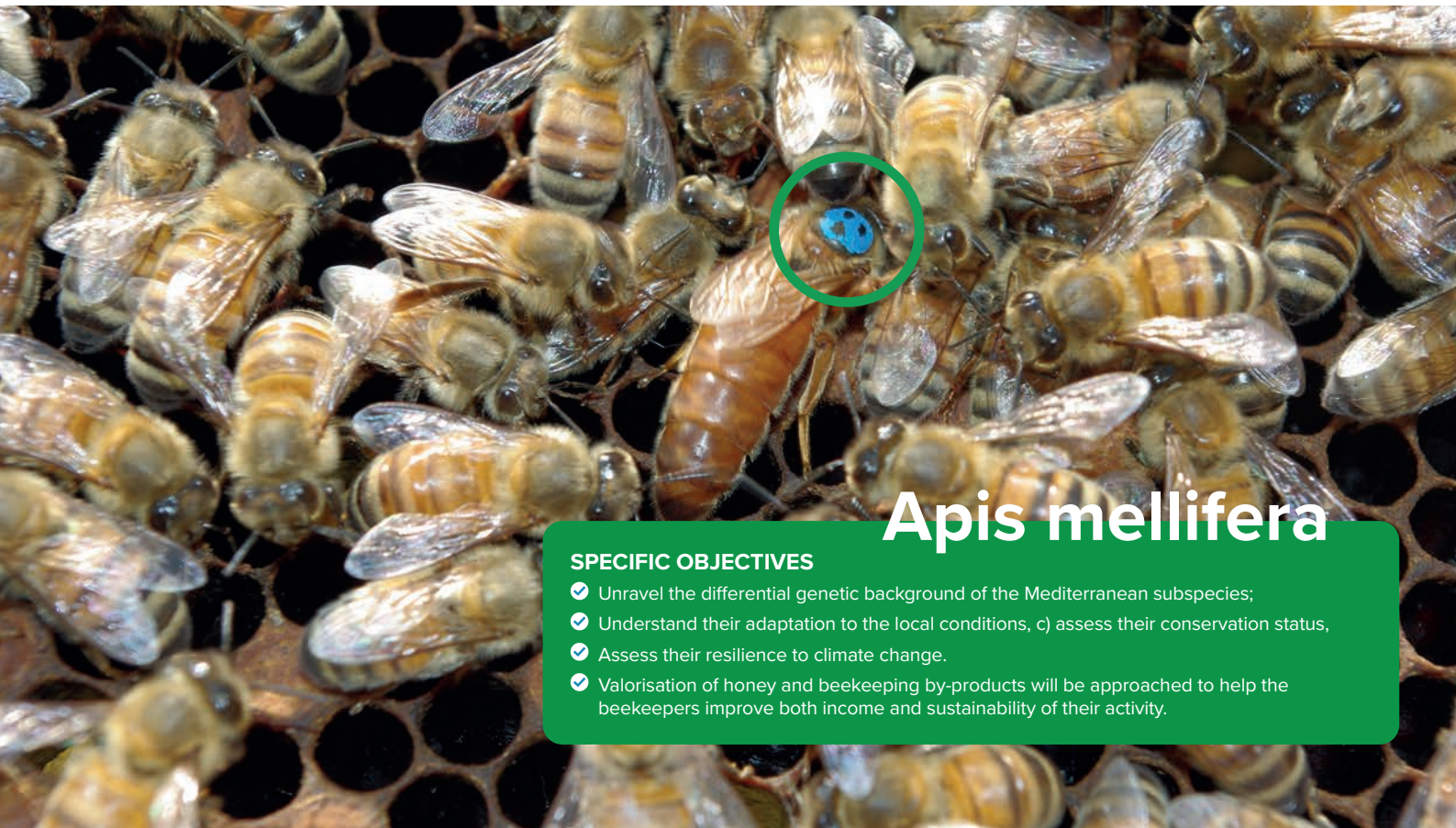
Centro de Investigação de Montanha, Portugal
Scientific Officer: PINTO, Alice

University of Namik Kemal, Turkey
Scientific Officer: MUZ, Mustafa Necati

2. Valorisation of local Mediterranean subspecies:
   - Comparison of performance of local vs introduced subspecies;
   - Training of beekeepers in the use of efficient, cost-effective, and environmentally/socially sound management techniques;
   - Selection of genes underlying adaptation to biotic and abiotic stressors to mitigate the impact of climatic change. Development of a highly dense multi-subspecies SNP chip to certify subspecies or ecotypes for breeding programmes. Promoting breeding programmes to select relevant traits;
   - Valorisation of honey and determination of the viability of Quality labels. New tool for quality determination;
   - Valorisation of organic by-products generated by the beekeeping industry. Determination of their potential as soil fertilisers and biofumigants.

Expected impact and results

The project started on May 2021, and the expected effects of the projects are:
1. Generation of new insights on differential vulnerability and resilience of the Mediterranean honeybee subspecies to the leading environmental stressors. Defining advantageous adaptations of local subspecies. Helping tackle the problem of the introduction of foreign subspecies/strains into the Mediterranean region, serving the efforts to preserve locally adapted breeds.
2. Promoting the use of local subspecies. Contribution to creating new trade opportunities by the commerce of selected breeds of local subspecies and establishing the basis for introducing criteria of environmental resilience in breeding programs.
3. Development of advanced tools to support the genetic selection of subspecies for resilience to climate change and to detect honey frauds.
4. Helping beekeepers promote their honey by supporting the development of Quality labels to increase its economic value (more competitive in the local market).
5. Testing beekeeping by-products with a focus on agroecosystem to increase soil fertility and contribute to the circular economy.
6. Increase the know-how, including scientists, beekeepers, consumers, the general public, involving a woman in the process.
7. Improvement of the beekeeper production systems in the Mediterranean in a resilient, efficient, and cost-effective fashion, and according to environmental and social sustainability.
8. Increase profitability for the survival of the apiculture industry to guarantee this farming activity and therefore contributing to food security.



Apis mellifera

SPECIFIC OBJECTIVES

- Unravel the differential genetic background of the Mediterranean subspecies;
- Understand their adaptation to the local conditions, c) assess their conservation status,
- Assess their resilience to climate change.
- Valorisation of honey and beekeeping by-products will be approached to help the beekeepers improve both income and sustainability of their activity.

Thematic Area

Farming Systems

Section I

Topic - Genetic conservation and animal feeds
Sub-topic B - Alternative animal feeds

Action

IA - Research & Innovation Action

Budget

2.057.528 €

Duration

48 months

State and Coordinator Entity

SPAIN

Fundación AZTI

MEMBER OF
BASQUE RESEARCH
& TECHNOLOGY ALLIANCE

Scientific Officer:
SAN MARTIN, David

Participating States/ 4

Research Units/ 14

Section I

6. NEWFEED

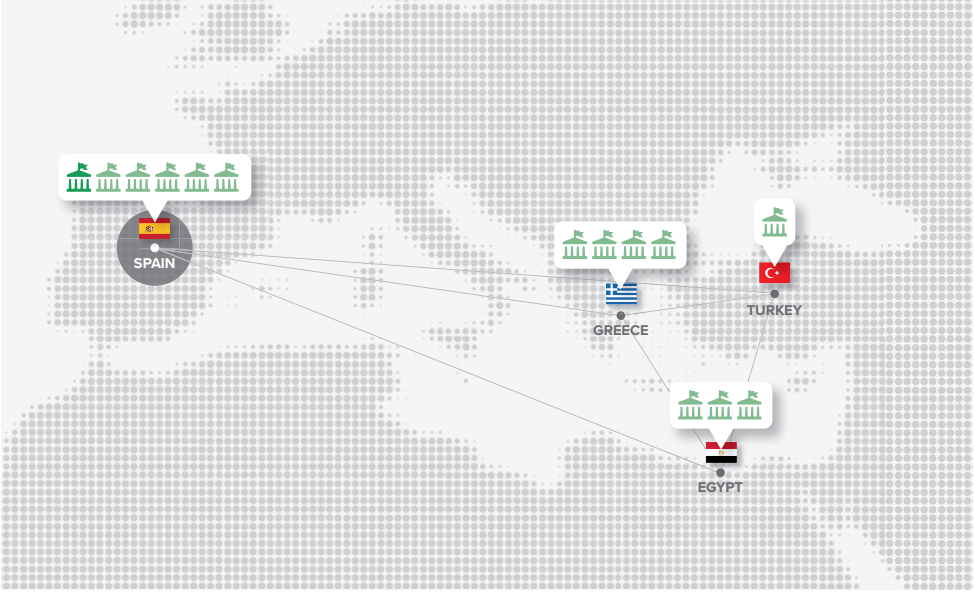
Turn food industry by-products into secondary feedstuffs via circular-economy schemes

Context

There is a need to ensure sustainability for the animal breeding business in a context where livestock farms are increasingly exposed to animal welfare trends and climatic risks.
Feeding represents the main cost of a livestock system, with a tendency to increase feedstuff prices and maintenance or reduction of products prices. A decrease in availability and quality of plant forage causes the need to import highly-priced feedstuffs such as cereals. The lack of forage availability due to extreme weather conditions (water scarcity) is causing a more acidogenic behaviour of the rumen during the fermentation stage, which leads to subclinical damages and lower production rates.
Food by-products not marketed directly as human food can be used by feed and livestock industries. Bioprocessing techniques (solid fermentation and enzymatic hydrolysis) can increase their nutritional value and improve the assimilation of nutrients by animals. They are often rich in lower nutritional value compounds such as lignocellulosic structures. The final stabilisation process also ensures the nutritional value, feed safety and shelf life of the ingredients.
Defining a suitable feeding strategy based on nutritional value and digestibility of food by-products is a challenge of the feed market to use them to maximum benefit.

Objective and contents

This project aims to ensure the sustainability of feeding livestock in the Mediterranean area. We use food industry by-products as secondary feedstuffs in circular-economy schemes to transform livestock production into a more sustainable system that responds to the increasing demand for animal-derived products such as meat, dairy, or eggs. The concept is “a circular economy approach in livestock production by valorising the by-products of the food industry as secondary feedstuff to produce new feed ingredients”.
This project will test and demonstrate new feed resources’ technical and economic viability based on local agricultural production (winery, orange juice, and olive oil food industries by-products) in the South and East of the Mediterranean: Spain, Greece, and Egypt. The winery, orange juice and olive oil are three of the most representative



Other Entities/ 13

NEIKER, IInstitute for Agricultural Research and Development, Spain
Scientific Officer: GARCIA, Aser

Riera Nadeu SA, Spain
Scientific Officer:
FENOLLOSA DOMENECH, Ricard

Unión Agroganadera de Álava, Spain
Scientific Officer: AUZMENDI, Sugoi

Bodegas Baigorri SAU, Spain
Scientific Officer: ARINA ROBLES, Simón

Confederación Española de Fabricantes de Piensos Compuestos para Animales, Spain
Scientific Officer:
DE SAJA GONZALEZ, Jorge

Heliopolis University for Sustainable Development, Egypt
Scientific Officer: EL-ARABI, Tarek

Sekem Development Foundation, Egypt
Scientific Officer: ELDAHAN, Omar

ISIS for Food Industries LTD, Egypt
Scientific Officer: VON LAUE, Sigward

National Technical University of Athens, Greece
Scientific Officer:
MOUSTAKAS, Konstantinos

Federation of Hellenic Food Industries, Greece
Scientific Officer: SALTA, Foteini

Hellenic Agricultural Organisation-Demeter, Greece
Scientific Officer:
KARATZIA, Maria-Anastasia

University of Western Macedonia, Greece
Scientific Officer: KASAPIDOU, Eleni

Middle East Technical University, Turkey
Scientific Officer: YETIS, Ulku

food industries of the Mediterranean area exploiting local agricultural production. Innovative techniques and technologies will improve the ingredient nutritional value and digestibility to accomplish the feed industry requests. The whole value chain and the impact of using these alternative animal feeds on animal productivity should be demonstrated in feed efficiency trials.
The sustainability of these value chains will also be evaluated: the profitability, the environment, and the social impacts.

Expected impact and results

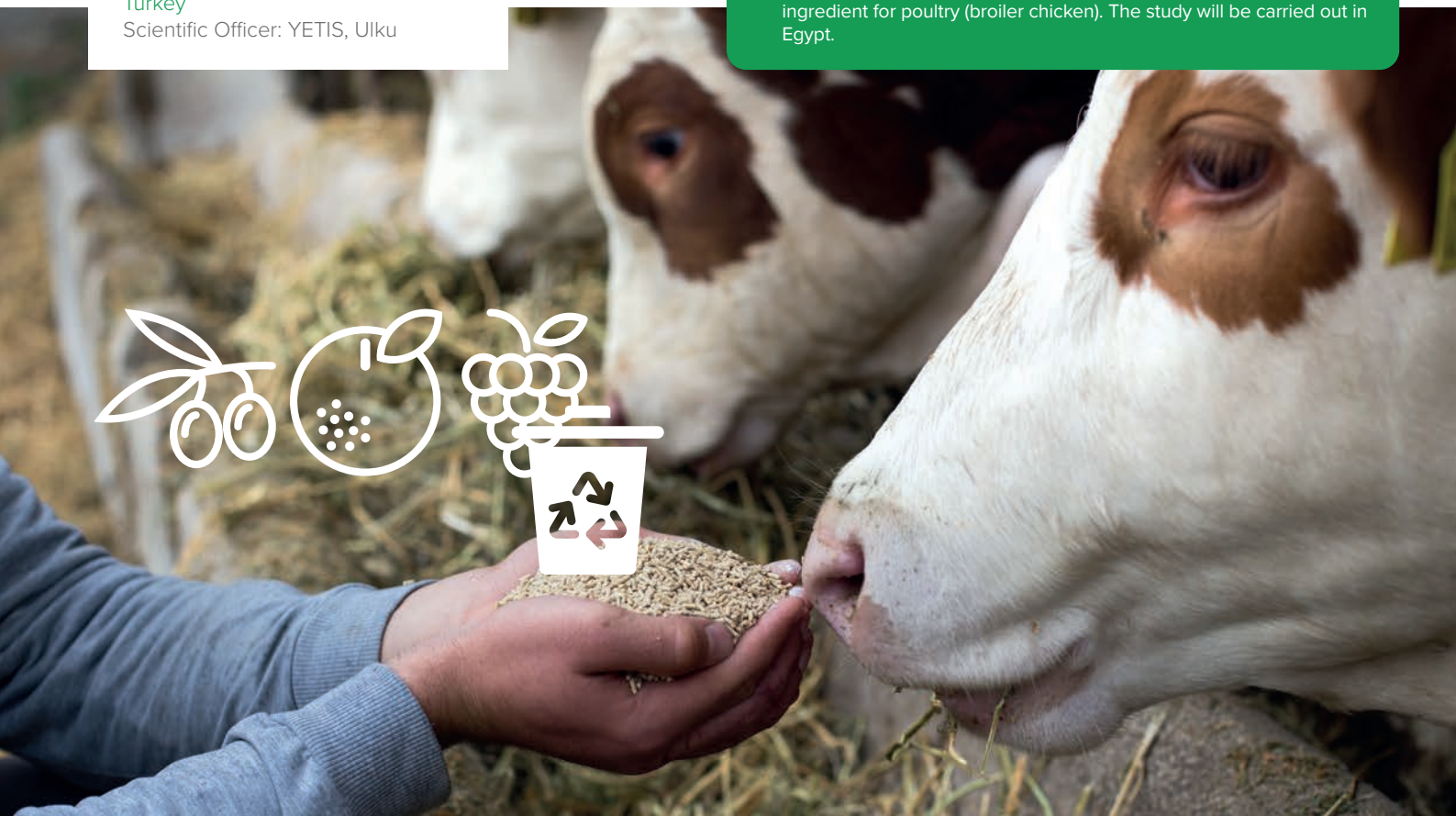
The development and adoption of at least three new alternative feed sources more sustainable and cheaper will render livestock production systems more resilient at a Mediterranean level in the medium and long-term period. This will meet the expectations of consumers and citizens in a context of environmental awareness, reducing external dependency while providing an adequate income and good working conditions to producers.

The expected project results are:

- Reducing the dependence on imported raw material for feed production by adopting three circular economy approaches in livestock systems. This is achieved by valorizing food by-products (winery, orange juice & olive oil) as an alternative feed for livestock (dairy cattle and sheep & broiler chicken) to produce new products (dairy & meat) for human consumption.
- Promote jobs and industrial activity in a circular economy model by valorizing three local crops by-products (grape stem, orange peel and olive cake) for animal feed.
- Reduce the cost of livestock production by three sustainable and economical alternative feeds and improve the quality of final products by compliance with the nutritional husbandry requirements and food and feed safety.
- Creation of new cross-sector interconnections (food industry and livestock) to increase their competitiveness.

Three different value chains will be validated to create new business opportunities:

- Valorisation of grape stem from wineries as a second-generation feedstuff to produce a new feed ingredient for ruminants (dairy sheep and cattle). The study will be carried out in Spain.
- Valorisation of orange peel from orange juice industries to produce an improved feed ingredient for ruminants (dairy sheep). The study will be carried out in Greece.
- Valorisation of olive cake from olive oil industry to produce feed ingredient for poultry (broiler chicken). The study will be carried out in Egypt.



Thematic Area

Farming Systems

Section I

Topic - Conservation and valorization of local Animal Genetic Resources

Action

RIA - Research & Innovation Action

Budget

1.750.000 €

Duration

48 months

State and Coordinator Entity

ITALY

Università Cattolica del Sacro Cuore, Dipartimento di Scienze animali, della nutrizione e degli alimenti

Scientific Officer:
AJMONE-MARSAN, Paolo

Participating States/ 5

Research Units/ 17

Section I

7. SCALA-MEDI

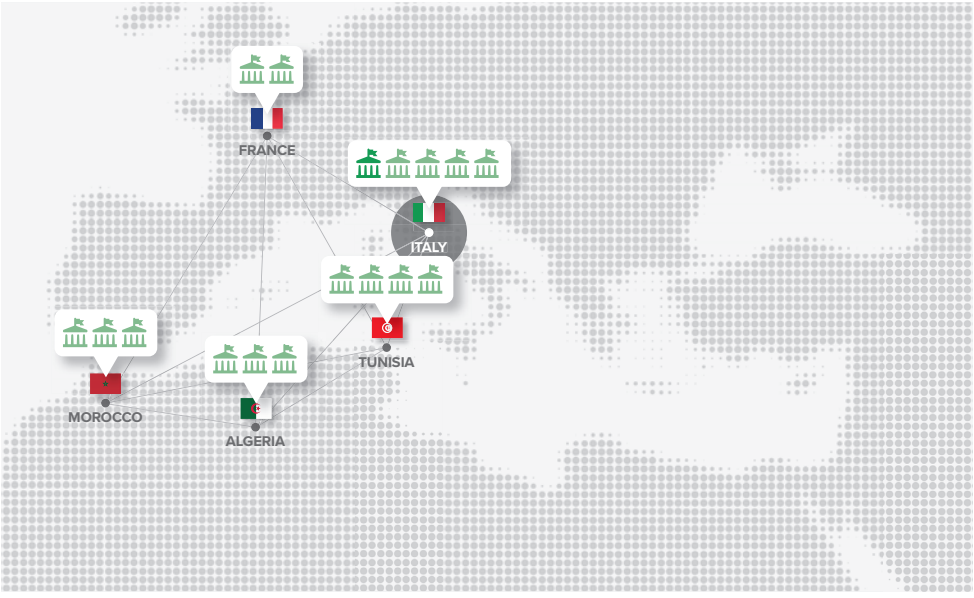
Improving sustainability and quality of Sheep and Chicken productions by leveraging the Adaptation potential of LocAl breeds in the MEDIterranean area

Context

Sheep and chicken are the most important livestock species in the Southern Mediterranean countries. They are the basis of the local diets and are reared in marginal areas of the Northern Mediterranean. In Europe, the management of local sheep and chicken breeds is well characterised. Still, in North Africa, local and regional populations and breeds are poorly defined while possessing unique adaptation to the harsh environment. Accelerated selection for thermal tolerance and resilience to new endemic diseases is becoming urgent to counteract the detrimental effect of climate change on livestock welfare, as it is the valuation and conservation of local breeds as a reservoir of unique gene variants. Genomics plays a vital role in this respect, with phenotype recording and epidemiological and environmental data collection. Breeding for adaptation to climate change and mitigation of livestock's impact on climate change is probably the most complex challenge the sector has ever faced.

Objective and contents

The SCALA-MEDI project will characterise the genetic and phenotypic diversity of Mediterranean local breeds of sheep and chicken and study their ability to adapt to harsh environments and management systems. The project will leverage data produced in EU projects and generate new data. It includes traditional production traits and new technologies for remote phenotyping of adaptation-related traits, genotyping, and exploring the genome methylation status of animals reared in different environmental conditions. Data and samples will be collected on local breeds from Tunisia, Algeria, and Morocco (16 sheep breeds and village chicken populations from different bio-climatic environments), taking advantage of local expertise in Italy and France. Local resources will be characterised for the farming system, diversity, distinctiveness, and adaptive traits. Genomic data will be analysed to identify loci controlling adaptation traits and product authenticity. It will create decision-making tools to improve conservation and selection programmes and management strategies for the Mediterranean livestock production system to face future climate change scenarios.



Other Entities/ 16

Consiglio Nazionale delle Ricerche (CNR), Istituto di Biologia e Biotecnologia Agricola, Italy
Scientific Officer: STELLA, Alessandra

Fondazione Centro Euro-Mediterraneo sui Cambiamenti Climatici, Divisione IAFES, Impacts on Agriculture, Forests and Ecosystem Services, Italy
Scientific Officer: CHILLEMI, Giovanni

Agenzia Regionale per la Ricerca in Agricoltura, AGRIS Sardegna, Italy
Scientific Officer: CARTA, Antonello

Nature 4.0, Soc. Benefit srl, Italy
Scientific Officer: VALENTINI, Riccardo

University of Sciences and Technology of Oran "Mohamed Boudiaf", Algeria
Scientific Officer: TABET AOUL, Nacera

University of Tlemcen "Abou Bekr Belkaid", Département d'Agronomie, Algeria
Scientific Officer: AZZI, Noureddine

Technical Institute of Breeding/ Tlemcen, Algeria
Scientific Officer: ZITOUNI, Ghania

Institut de l'Elevage, France
Scientific Officer: LOYWYCK, Valérie

Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement (INRAE), France
Scientific Officer: TIXIER-BOICHARD, Michèle

Institut National de la Recherche Agronomique (INRA), Morocco
Scientific Officer: BENJELLOUN, Badr

Moroccan Poultry Federation, Morocco
Scientific Officer: JERRARI, Chaouki

Association Nationale Ovine et Caprine, Morocco
Scientific Officer: JANNOUNE, Abderrahamane

High School of Agriculture of Mateur, Tunisia
Scientific Officer: BEN LARBI, Manel

Institut National Agronomique de Tunisia (INAT), Tunisia
Scientific Officer: M'HAMDI, Naceur

Office de Développement Sylvo Pastoral du Nord Ouest, Tunisia
Scientific Officer: KHEMIRI, Hichem

National Genebank of Tunisia, Tunisia
Scientific Officer: EL HENTATI, Haifa

Expected impact and results

Tools to manage diversity, breeding and crossbreeding strategies will be designed to improve sustainable production and exploit adaptation and increase the value of local populations. This will promote their use and safeguard local genetic resources through on-farm conservation. The tools will be showcased in nucleus flocks, and breeding centres as part of comprehensive dissemination and knowledge transfer plans to ensure project outputs are applied. The added value of local populations will foster the exploitation of results beyond the end of the project. SCALA-MEDI will use the data collected on genetic diversity to optimise strategies for cryo-conservation to ensure biodiversity backup in case of need. Existing local Biobanks in North Africa will receive training in the latest techniques and be reinforced by creating links with biobanks operating across the Mediterranean basin. SCALA-MEDI has an international, interdisciplinary team in including experts in animal farming, animal breeding, animal physiology, veterinary science, conservation biology, population genetics, molecular genetics, reproduction biotechnologies, statistics, and socioeconomics, plus a super-computing centre, breeder associations and SMEs.

Characterization, valorization and sustainable conservation of the genetic resources of Mediterranean sheep and poultry

16 sheep breeds

15 poultry breeds

Thematic Area

Farming Systems

Section I

Topic - Genetic conservation and animal feeds
Sub-topic B - Alternative animal feeds

Action

IA - Innovation Action

Budget

2.209.000 €

Duration

48 months

State and Coordinator Entity

ITALY

Università degli Studi di Perugia, Dipartimento di Ingegneria Civile ed Ambientale

Scientific Officer:
FANTOZZI, Francesco

Participating States/ 3

Research Units/ 5

Section I

8. SURFOLY

SUstainable Ruminants Feed with OLive pomace and polYphenols enriched charred olive stone

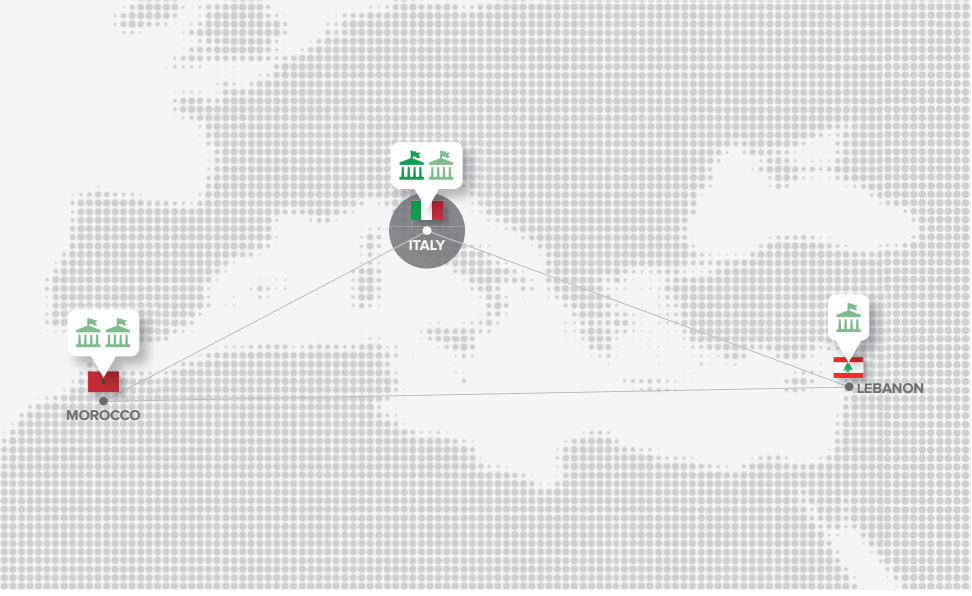
Context

Sheep and goat farming is a source of employment in disadvantaged agricultural areas. The high-quality products obtained are universally recognized as the result of a multifunctional and sustainable form of agriculture that contributes effectively to the safeguard of the environment and the social cohesion of rural areas. The sector, however, does not guarantee economic sustainability nor in the MENA region nor the EU. Any action that increases yields and quality of products or makes available feed and supplements with better value for money is an essential contribution to the sector's sustainability. The regions bordering the Mediterranean share the cultivation of olive trees and the consequent olive oil industry among the primary sources of profitability. The sector concentrates in a few months a high production of by-products (pomace and wastewaters), which is associated with a significant environmental impact, exceptionally high for wastewaters, where the presence of polyphenols can be toxic to vegetation and microbial population when used in soils and contributes to the eutrophication of waterways. On the other hand, the dried pomace finds application in the feed sector or as a fuel, although the use is much lower than the availability.

It is possible to increase the added value of the entire supply chain, both for breeders and for operators in the olive and oil agro-industry, through an integrated approach that valorizes the by-products of the oil industry into an innovative feed for sheep and goats. At the same time, this can be done by significantly reducing the environmental impact on the supply chain's life cycle and through a mixed crop-livestock system.

Objective and contents

SURFOLY promotes and demonstrates an innovative business and sustainable development model in the circular economy to produce two innovative animal feeds for lactating and fattening small ruminants (sheeps and goats) while supporting mix crop-livestock system and the olive industry in the Mediterranean area. The new feed contains olive oil by-products (pomace, stone, and polyphenols from wastewaters) utilised in an innovative way to improve performance and product quality and reduce the overall environmental impact on the life cycle of the combined system olive mill - feed manufacturer - farm.



Other Entities/ 4

Tecnologie per la Riduzione delle Emissioni Engineering srl, Italy
Scientific Officer: ARCIONI, Livia

American University of Beirut, Lebanon
Scientific Officer: ARCIONI, Livia

Institut Agronomique et Vétérinaire Hassan II, Morocco
Scientific Officer: ARABA, Abdelilah

Alf Mabrouk, Morocco
Scientific Officer: AIT AMAR, Brahim

Olive stone or dried pomace are then pyrolyzed in an innovative regenerative, rotary kiln to obtain biochar used to reduce the COD (Chemical Oxygen Demand) of olive mill wastewaters by absorbing polyphenols, hence significantly reducing the polluting impact of their use as a fertilizer or disposal.
The polyphenol's enriched char has antioxidant potential and can reduce methane emissions from ruminants; therefore, it is added to dried pomace to produce a nutrient mix which is eventually pelletised and used as an ingredient in the new formula for sheep and goats. To further increase the mix crop-livestock model introduced by SURFOLY, when small ruminants are allowed to graze in olive orchards, digested biochar is released back as a carbon sink in the fields.

Expected impact and results

SURFOLY's scientific impact is substantial because it will produce experimental data, currently not available in the literature, on various aspects such as biochar quality and production efficiency from olive stone and pomace in the removal of polyphenols from wastewaters; the energy and economic sustainability of the pyrolysis process on solid mill residues.
The effect of biochar and the release of polyphenols in the diet of meat and dairy small ruminants, in terms of animal welfare, palatability, quality and yield of products, and enteric emissions of methane, through direct measurements.
The environmental benefit introduced by SURFOLY with the integrated business model cultivation-industry-feed-farming in a circular economy is also substantial.
Finally, the economic impact of SURFOLY for farmers and the olive agro-industry and olive oil is significant, contributing respectively to a potential increase in the economic value of cheese and meat, thanks to the combined effect of improving yield and product quality, and to a reduction in the cost of disposal of vegetation water, with a competitive cost expected for bio-char production. Given the high selling price of biochar, this can effectively contribute to the added sustainability of olive mills.

New feed from by-products of the oil industry (pomace, stone and polyphenols from wastewaters)

Pilot pyrolysis plant at the Sustainable Energy System Laboratory of the University of Perugia

Thematic Area

Farming Systems

Section I

Topic - Genetic conservation and animal feeds
Sub-topic B - Alternative animal feeds

Action

IA - Innovation Action

Budget

2.299.388 €

Duration

48 months

State and Coordinator Entity

SPAIN

ALIA Sociedad Agraria De Transformacion 2439

Scientific Officer:
SEGURA RUIZ, Juan Carlos

Participating States/ 4

Research Units/ 8

Section I

9. SUSTAvianFEED

Alternative animal feeds in Mediterranean poultry breeds to obtain sustainable products

Context

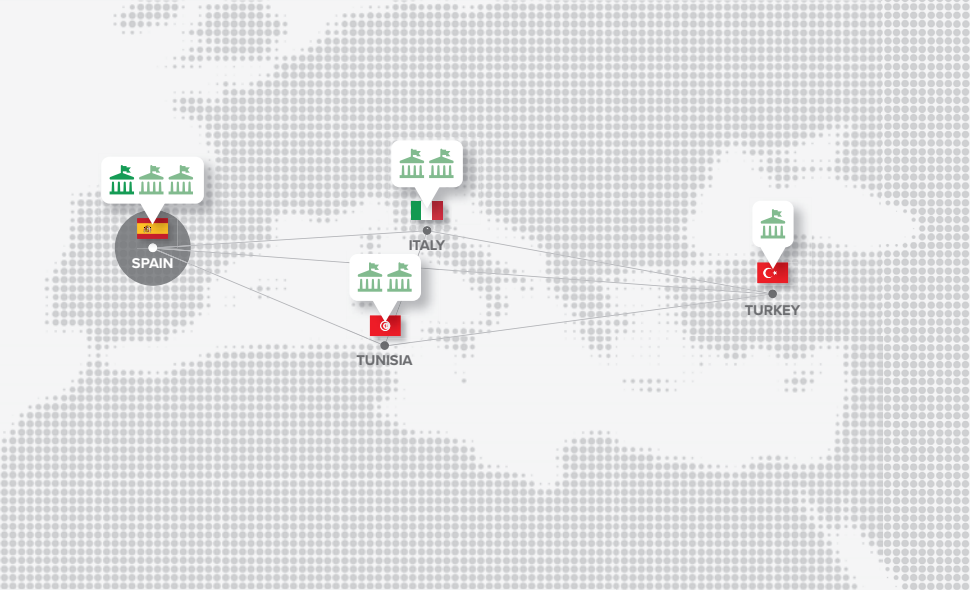
The recent IPCC special report on Climate Change and Land stresses that it will be impossible to keep global temperatures at safe levels unless there is a transformation in how the world produces food and manages the land.
It estimates that 25-30% of global greenhouse gas emissions are consequences of the food system, which greatly contributes to air, soil and water pollution and biodiversity loss. In this context, it is necessary to introduce sustainable practices based on circular economy principles.
New food chains must be environmentally friendly, foster local economies and consider social aspects. Feed production will be the mainstream of this change.
SUSTAvianFEED aims to demonstrate innovative poultry farming systems by the inclusion of sustainable animal feeding. The project will develop a sustainable nutritional formula for poultry farming in which insects will play a key role and lead to an innovative poultry farming approach.

Objective and contents

SUSTAvianFEED aims to demonstrate the efficacy of innovative poultry farming systems and the social effects in rural Mediterranean areas, with a specific focus on gender equality.

The main objectives of the SUSTAvianFEED are:

- to preserve avian biodiversity preservation by promoting the use of autochthonous poultry breeds or local hybrids;
- to develop a sustainable nutritional formula for poultry farming through the use of insects and the substitution of standard protein sources (as soybean or fishmeal) in the poultry feeding programs; Life Cycle Assessment (LCA) techniques or similar will be used to determine the sustainability improvements of our approach;
- to promote local economy, socioeconomic growth and local resilience of Mediterranean areas, by providing subsidiary incomes as well as high-quality meat and eggs, promoting the commercialization of local products and maximizing the incomes;



Other Entities/ 7

University of Murcia, Spain
Scientific Officer:
MARTINEZ MIRO, Silvia

ENTOMO Consulting SL, Spain
Scientific Officer:
CORTES ORTIZ, Juan Antonio

Università degli Studi di Torino,
Dipartimento di Scienze Veterinarie, Italy
Scientific Officer: SCHIAVONE, Achille

Fondazione Slow Food per la Biodiversità Onlus, Italy
Scientific Officer: MAINARDI, Marina

University of Sousse, Higher Institute of Agricultural Sciences of Chott Mariem, Tunisia
Scientific Officer: HAJ AYED, Madiha

Association Rayhana pour femmes de Jendouba, Tunisia
Scientific Officer: ALLOUCHI, Nacyb

Ege Üniversitesi, Turkey
Scientific Officer: YALÇIN, Servet

- to demonstrate the feasibility and suitability of alternative nutritional formula in Mediterranean areas: five pilots will be developed in four different Mediterranean countries (Tunisia, Turkey, Spain and Italy); furthermore social, environmental and economic analysis will be developed for each pilot;
- to improve animal health and welfare by Feeding birds with insects, that will improve their native behavior and gut health;
- to promote gender equality and empowerment of women; the project will engage rural women in pilot activities in Tunisia, so sustainable business models are developed for women socio-economic growth;
- to develop a multi-actor approach in which relevant actors of the whole value chain are involved; by implementing Living Labs activities, each pilot area will engage the relevant stakeholders of the different stages along the whole supply chain.

Expected impact and results

SUSTAvianFEED has a great potential impact on farming practice and human social environment, as described below:

- reduction of at least 10-15% of GHGs emissions per kg of poultry feeding in comparison with the traditional ones;
- improvement of the use of agriculture by-products to produce insect will contribute to circular economy;
- contribution to poultry biodiversity preservation by promoting the use of authoctonous poultry breed and local hybrid in Spain, Italy, Tunisia and Turkey;
- reduction of feed cost by promoting the use of local by-products;
- promote mix crop-livestock systems, which include insect farming (to valorize agriculture waste), alternative poultry feeding practice (including insects and agriculture by-products), thus promoting circular economy;
- socioeconomic growth of small-scale farmers in the Mediterranean marginalized rural areas, thanks to high quality poultry products;
- implementation of the gender equality and women empowerment of the Mediterranean regions, with a specific focus in Tunisia.

Thematic Area

Agri-food Value Chain

Section I

Topic - Valorising the health benefits of Traditional Mediterranean food products

Action

IA - Innovation Action

Budget

2.072.042 €

Duration

42 months

State and Coordinator Entity

FRANCE

Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement (INRAE), Biopolymères, Interactions, Assemblages

UR 1268 bia Biopolymères Interactions Assemblages

Scientific Officer: LE-BAIL, Patricia

Participating States/ 10

Research Units/ 18

Section I

10. FLAT BREAD MINE

Flat Bread of Mediterranean area
INnovation and Emerging process and technology

Context

Flat bread is a traditional staple product from the Mediterranean Area with products from Italy, Malta, Greece, Croatia, Jordan, Egypt with great emphasis for industry and consumers of Mediterranean Area.
Flat bread faces several challenges; A first issue concerns the growth of the organic flat bread market. Organic flour tends to have fewer proteins with lower quality than conventional flour, exceptionally high molecular weight glutenin that contribute to the oven rise and gas holding capacity. The second concern is the low production of soft wheat in the Mediterranean Area and the partial replacement with other autochthonous cultivars (i.e., durum wheat), crops from dry regions (millet, carob, acorn) or with crops with high nutritional value like oat and barley or pulse.
From a nutrition point of view, the precise impact of the leavening (yeast vs sourdough) and the baking process on the Glycaemic Index has been minimally investigated so far. There is also a burden of celiac disease in the Mediterranean Area. Mycotoxins are another risk that is often higher in wholemeal flour and organic products. In addition, conventional baking methods of flat bread are energy-intensive due to high baking temperature. This addresses an environmental impact but also possible safety issues regarding acrylamide.

Objective and contents

FLAT BREAD MINE concept is based on re-exploring the potential interest of different technologies, processes & reformulation to produce healthy non-organic and organic flat bread for the Mediterranean Area.

Technologies considered by FLAT BREAD MINE: Vacuum mixing will be developed and adapted as it permits better control of the dough rheology, control of the dough aeration and a more cohesive gluten network with less elasticity. A new commercial mixer will be developed for flat bread use.
Flat bread is usually baked at high temperatures (over 300°C). An innovative low-pressure baking oven that allows controlling the oven rise with low-temperature baking will be tested.

Other Entities/ 17

Oniris, Ecole Nationale Vétérinaire, Agroalimentaire et de l'alimentation de Nantes-Atlantique, GEPEA (UMR CNRS 6144), France
Scientific Officer: LE-BAIL, Alain

YEC'HED MALT, France
Scientific Officer: LAMOUREUX, Hervé

Vendée Mécanique Industrie, France
Scientific Officer:
CHEO DE OLIVEIRA, José

University of Zagreb, Faculty of Food Technology and Biotechnology, Croatia
Scientific Officer: NOVOTNI, Dubravka

KROŠTULA Pekarnica, Croatia
Scientific Officer: VULIN, Karlo

Food Technology Research Institute, Egypt
Scientific Officer: SALEM, Eman

Consejo Superior de Investigaciones Científicas-Instituto de Agroquímica y Tecnología de Alimentos (CSIC), Spain
Scientific Officer: ROSELL, Cristina M.

Grupo BIMBO, Spain
Scientific Officer: MINGUEZ, Irene

International Hellenic University, Greece
Scientific Officer:
PAPAGEORGIOU, Maria

Università degli Studi di Bari Aldo Moro, Dipartimento di Scienze del Suolo, della Pianta e degli Alimenti, Italy
Scientific Officer:
PASQUALONE, Antonella

MATARRESE srl, Italy
Scientific Officer: MATARRESE, Roberto

Facts-Center Scientific Food Center, Jordan
Scientific Officer: AL-DMOOR, Hanee

Université Saint Joseph, Lebanon
Scientific Officer: HELOU, Cynthia

Crown Flour Mills, Lebanon
Scientific Officer: MAKHOUL, Salim

University of Malta, Malta
Scientific Officer: VALDRAMIDIS, Vasilis

FUNDING SUPPORT - MS Advisory Services Ltd, Malta
Scientific Officer: SCHEMBRI, Maria

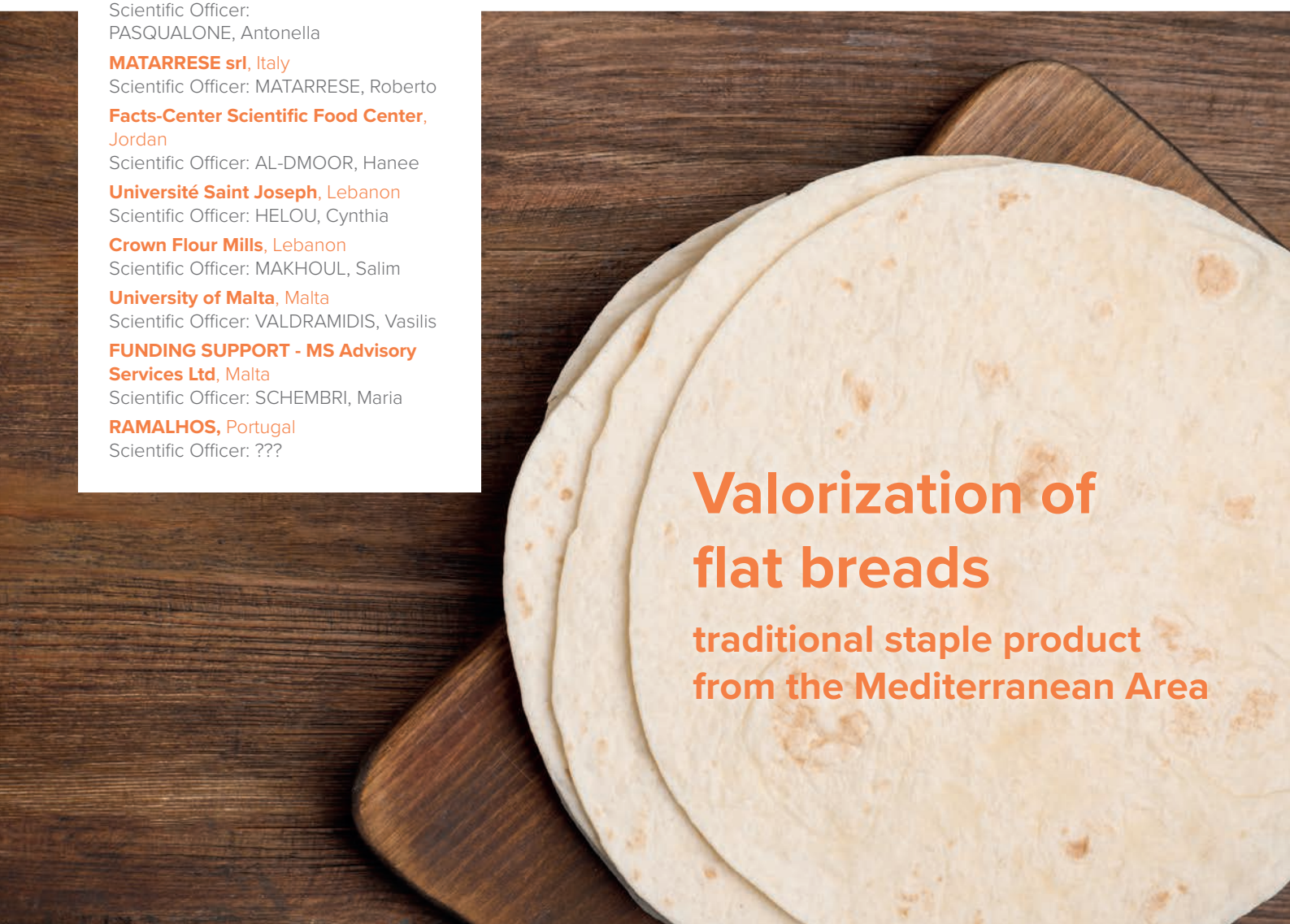
RAMALHOS, Portugal
Scientific Officer: ???

A partial baking process will be preferred and reduce the Glycaemic Index due to the partial disruption of starch.

Reformulation, Nutrition, Safety & Consumers will be at the heart of FLAT BREAD MINE: FLAT BREAD MINE will apply different strategies coupling process and reformulation aiming at improving the nutrition profile of FB: Partial substitution of soft wheat by other crops more adapted to dry region; Sourdough fermentation; Development of Malted flour from wheat & barley; Gluten-free formulation; Salt reduction using vitamin B4; Emphasis will be put on the control of the Glycaemic Index thanks to sourdough and the power of the degree of baking.
Flat bread, like any food, is exposed to safety in general: mycotoxins, acrylamide, microbial and fungal risk, quality assessment & development of standardised methods will be considered.
Consumer's acceptance & sustainability will be studied.

Expected impact and results

FLAT BREAD MINE will contribute to improve the dietary habits of the population of the Mediterranean basin, which have been changing during the last decades. The optimization of the partial baking process and of the sourdough process will contribute to Glycaemic Index, fat, and salt reduction, to counterbalance negative health consequences such as rises in obesity and incidence of non-communicable diseases (such as diabetes, heart attacks, cancer). FLAT BREAD MINE will accommodate innovative techniques of food processing, country-specific variations (recipe, consumption habits), and multiple sustainable benefits (local production, local sourcing of raw ingredients, reduction of the baking energy). FLAT BREAD MINE will also contribute to engage multiple stakeholders and the consumers towards an innovative and integrated food system concept that connects production, transformation & consumption, in a sustainable and healthy way, thus paving the way for tackling growing challenges facing the Mediterranean populations.



Thematic Area

Agri-food Value Chain

Section I

Topic - Valorising the health benefits of Traditional Mediterranean food products

Action

IA - Innovation Action

Budget

1.905.211 €

Duration

48 months

State and Coordinator Entity

TURKEY

Middle East Technical University, Department of Food Engineering

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
MIDDLE EAST TECHNICAL UNIVERSITY

Scientific Officer:
OZTOP, Mecit

Participating States/ 8

Research Units/ 16

Section I

11. FunTomP

Functionalized Tomato Products

Context

FunTomP is a multidisciplinary project that aims to formulate new Mediterranean Food Products for the new generation by putting two important agricultural crops of the Mediterranean into focus. Tomatoes and olives will be the main ingredients of these products. Having the chance to reattract the attention of the Mediterranean consumers back to the very valuable Mediterranean Food; conducting a consumer analysis on the Mediterranean Foods; using novel and green production technologies; utilizing the waste generated from different processes in the product formulations were the main motivations of the project. With a consortium of 16 members from North Africa, Middle East and Europe having different expertise FunTomP will end up with new functional food products.

Objective and contents

The objective of FunTomP is to reformulate traditional Mediterranean tomato products considering the current consumer trend of 'functional foods', using leaf proteins (by-products of sugar beet processing) and olive powder by using novel and eco-friendly processing technologies that will impact the nutrients minimally. Tomato will be transformed to different functional foods (juices, sauces, leather, bars, powder mixes) offering extra health benefits to satisfy the consumer demand while keeping a sustainable product and process cycle with the valorization of agricultural waste.

Expected impact and results

FunTomP will use tomato as the main ingredient which is known the be one of the major 'good health 'contributors of MedD' and will enhance this nutritional value with the addition of olive powders and sugar beet leaf protein isolate (rubisco) in its formulations and will develop foods at different categories. Getting the protein need partially from such products will also be important in terms of nutrition and eating less meat and dairy has also been identified as a factor in curbing climate change.
In addition to the developed products, from the waste generated during processing, bioactive ingredients will also be produced.

Other Entities/ 15

Ege Üniversitesi, Turkey
Scientific Officer: ERSUS, Seda

Turkish Accelerator and Radiation Laboratory, Turkey
Scientific Officer:
KABASAKAL, Burak Veli

ASSAN Foods, Turkey
Scientific Officer: EROL, Nursen

Van Yuzuncu Yil University, Turkey
Scientific Officer: GORGISEN, Gokhan

SELUZ Fragrances & Flavour, Turkey
Scientific Officer: OZARDA, Ozlem

Ruder Boskovic Institute, Croatia
Scientific Officer:
MALTAR STRMECKI, Nadica

University of Zagreb, Faculty of Food Technology and Biotechnology, Croatia
Scientific Officer:
REZEK JAMBRAK, Anet

University of Zagreb, Faculty of Electrical Engineering and Computing, Croatia
Scientific Officer: PLESLIC, Sanda

Asociación de Investigacion de la Industria del Juguete Conexas y Afines (AIJU), Spain
Scientific Officer: VARELA, Paco

Lomartov SL, Spain
Scientific Officer: HERRAIZ, Isaac

Aristotle University of Thessaloniki, Biomics_AUTh, Greece
Scientific Officer:
THEODORIDIS, Georgios

Consiglio Nazionale delle Ricerche (CNR), Istituto di Biologia e Biotecnologie, Italy
Scientific Officer: PUCCI, Laura

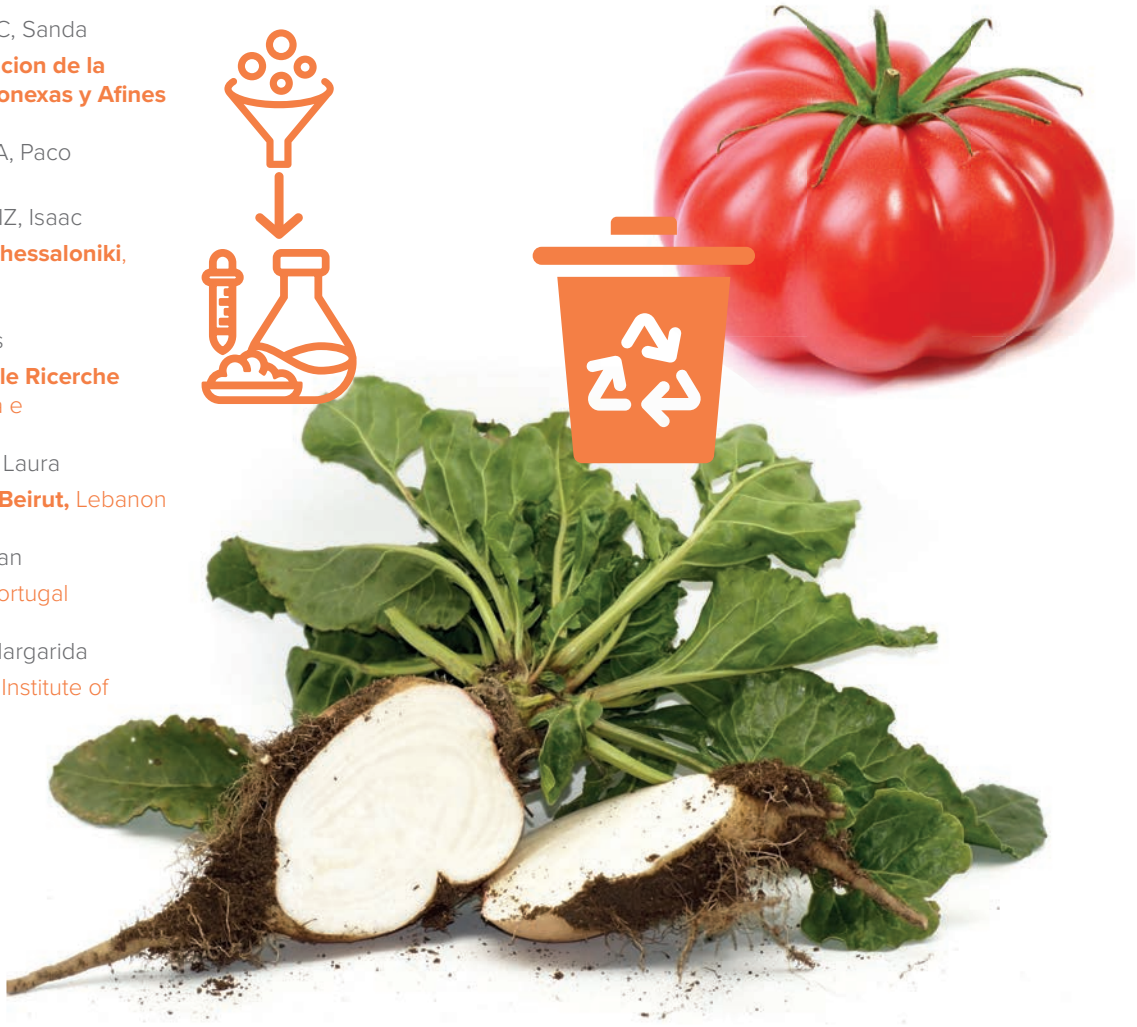
American University of Beirut, Lebanon
Scientific Officer:
ABIAD, Mohamad Ghassan

University of Algarve, Portugal
Scientific Officer:
CORTES VIEIRA, Maria Margarida

University of Sfax, High Institute of Biotechnology, Tunisia
Scientific Officer: ???

FunTompP will use 3 different eco-friendly food processing technologies that will have minimum impact on the nutritional quality (MAPS, UV-C, and US for microbial inactivation and also for protein extraction) and processes that will improve the already existing quality (with high pressure homogenization). Based on the previous experts' contributions and consumer analysis studies, a more complete information regarding with Mediterranean cultural inheritance (diet, physical activity and socio-cultural habits) will be obtained. This information will be complemented with FunTomP's project results with special mention to the developed prototypes in order to create a Best Practices Guidelines that will address to final consumers to promote the benefits of Mediterranean diet and its importance as cultural inheritance. In this guide, special consideration will be given to highlight the importance of sustainable consumption, through consumer awareness in the socio-economic benefits of the acquisition of food products that come from a fair production chain. In addition, FunTomP products will also be addressing the SDG of 2.2.2 that targets an elimination of wasting, and the prevalence of children being overweight by 2030.

Reformulate traditional Mediterranean tomato products considering the current consumer trend of 'functional foods'



Thematic Area

Agri-food Value Chain

Section I

Topic - Valorising the health benefits of Traditional Mediterranean food products

Action

IA - Innovation Action

Budget

2.000.000 €

Duration

42 months

State and Coordinator Entity

SPAIN

Institut de Recerca i Tecnologia Agroalimentaries

IRTA RESEARCH & TECHNOLOGY FOOD & AGRICULTURE

Scientific Officer:
AGUILÓ, Ingrid

Participating States/ 8

Research Units/ 20

Section I

12. LOCALNUTLEG

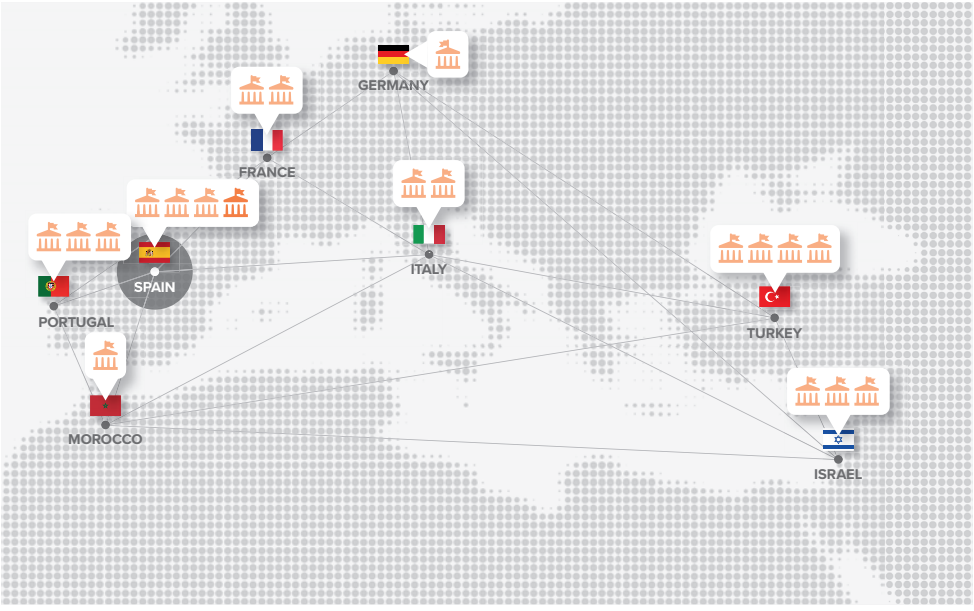
Developing of innovative plant-based added-value food products through the promotion of LOCAL Mediterranean NUT and LEGume crops

Context

In the last years, consumers demand healthy foods and diets has exponentially increased. The potential incorporation of plant-based alternatives represents a robust value chain in integrating the local nut and legume sector in the national economy. In Europe, an increment of 11% in food and drinks featuring VEGAN claims was registered in 2019. The Mediterranean diet accomplishes this demand. It is one of the healthiest and most closely linked to socioecological practices, knowledge, and traditions, promoting sustainable food production, and connecting geographical origin with food quality and ecosystem services.
The motivation for this project is high. It is this way because it concerns a topic of healthy lifestyle and diet that is emerging beyond the population around the world and at the same time is promoting consciousness of health and the importance of food in health. Furthermore, the motivation and interest in the project are due because Mediterranean people encourage our diet as one of the healthiest diets and find options to merge with veganism lifestyle confirms the potential of local Mediterranean products.

Objective and contents

The project aims to develop innovative food products by the identification of local nut and legumes varieties tied to Mediterranean gastronomic culture, providing the maximum amount of nutrients and bioactive compounds, and promoting the Mediterranean diet through plant-based food products. Hence, LOCALNUTLEG will answer the current consumers' demands in terms of healthiness, convenience, ease of preparation, taste, proximity and also the strong growth in vegetarianism, the high demand for plant-based meat analogues rich in protein, the religious considerations having a significant impact in the development of prepared plant food and the increase in the launching of products to cover metabolic diseases and allergies such as lactose or cow's milk protein and gluten intolerance. LOCALNUTLEG will work under the concept of a multifactor approach consortium formed by researchers, food processing SMEs and cooperatives.



Other Entities/ 19

Universitat Politècnica de Catalunya, Spain
Scientific Officer: ROIG-VILLANOVA, Irma

Unió Nuts, Spain
Scientific Officer: RUIZ, Joan

Conserves Ferrer SA, Spain
Scientific Officer: FERRER, Josep

Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung eV, Germany
Scientific Officer: STÄBLER, Andreas

Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement (INRAE), France
Scientific Officer: JAN, Gwénaël

La Mandorle, France
Scientific Officer: COLLINO, Patricia

Agricultural Research Organization, Israel
Scientific Officer: SHELEF, Oren

Tel-Hai Academic College, Israel
Scientific Officer: BASHEER, Loai

ChickP, Israel
Scientific Officer: REIFEN, Ram

Università degli Studi di Milano, Dipartimento di Scienze per gli Alimenti, la Nutrizione e l'Ambiente, Italy
Scientific Officer: ALAMPRESE, Cristina

Zini Prodotti Alimentari spa, Italy
Scientific Officer: CONTIERO, Silvia

Moroccan Almond International, Morocco
Scientific Officer:
SIRVENT BAEZA, Jose Manuel

Instituto Politécnico de Bragança, Portugal
Scientific Officer: BARROS, Lillian

Centro de Investigação de Montanha, Collaborative Laboratory Mountains of Research, Portugal
Scientific Officer:
GONÇALVES, Alexandre

Sortegel-Produtos Congelados SA, Portugal
Scientific Officer: MOREIRA, Jorge

IZMIR Institute of Technology, Turkey
Scientific Officer: OZEN, Banu

Unpa Pastaneleri, Turkey
Scientific Officer: YILMAZ, Silvia

Urla Women Entrepreneurship Production and Management Cooperative, Turkey
Scientific Officer:
BATUR ÜNAY, Fatma Betül

Bursa Uludağ Üniversitesi, Department of Food Engineering, Turkey
Scientific Officer: GÖÇMEN, Duygu

Within the first six months of the project, the work done has been focused on studying and obtaining the raw materials and starting to shape the direction of the prototypes to develop, beginning the dissemination, communication and coordination plan creating the website, doing the firsts visits and planning meetings to align with the rest of the partners.

Expected impact and results

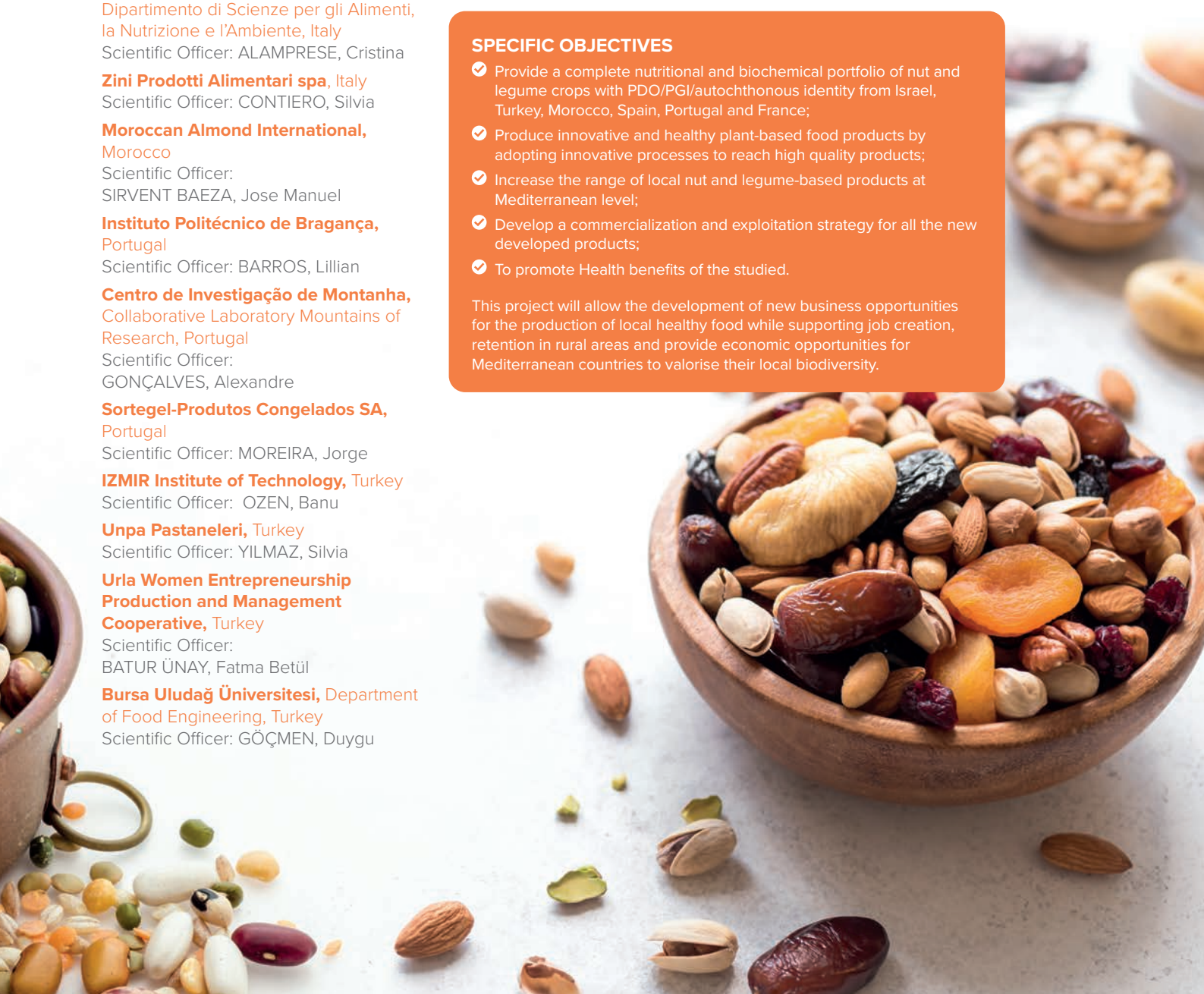
The principal impacts and results of the projects are to optimise eco-friendly food processing technologies and tools to preserve the original nutritional value and enrich the valuable bioactive contents in the final food products, compared to conventional methods. To develop new value-added foods products/forms from the traditional Mediterranean diet with proven health benefits, accompanied with a proper understanding of the markets and high end-customers satisfaction and trust. To develop efficient national/regional strategies, to address the critical gaps and to valorise the potential opportunities in the Mediterranean countries nutrition policy and to consider the socio-economic and health impacts that balance the dietary habits of Mediterranean consumers and the sustainability of Agri-food resources and also to contribute with the improved dynamics of Mediterranean lifestyle (diet, physical activity and socio-cultural practices) as an essential element of the Mediterranean cultural inheritance.

Empower local Mediterranean nuts and legumes

SPECIFIC OBJECTIVES

- Provide a complete nutritional and biochemical portfolio of nut and legume crops with PDO/PGI/autochthonous identity from Israel, Turkey, Morocco, Spain, Portugal and France;
- Produce innovative and healthy plant-based food products by adopting innovative processes to reach high quality products;
- Increase the range of local nut and legume-based products at Mediterranean level;
- Develop a commercialization and exploitation strategy for all the new developed products;
- To promote Health benefits of the studied.

This project will allow the development of new business opportunities for the production of local healthy food while supporting job creation, retention in rural areas and provide economic opportunities for Mediterranean countries to valorise their local biodiversity.



Thematic Area

Agri-food Value Chain

Section I

Topic - Valorising the health benefits of Traditional Mediterranean food products

Action

IA - Innovation Action

Budget

1.877.500 €

Duration

36 months

State and Coordinator Entity

ITALY

Università degli Studi della Tuscia, Dipartimento di Scienze Agrarie e Forestali

Scientific Officer:
SESTILI, Francesco

Participating States/ 6

Research Units/ 9

Section I

13. MEDWHEALTH

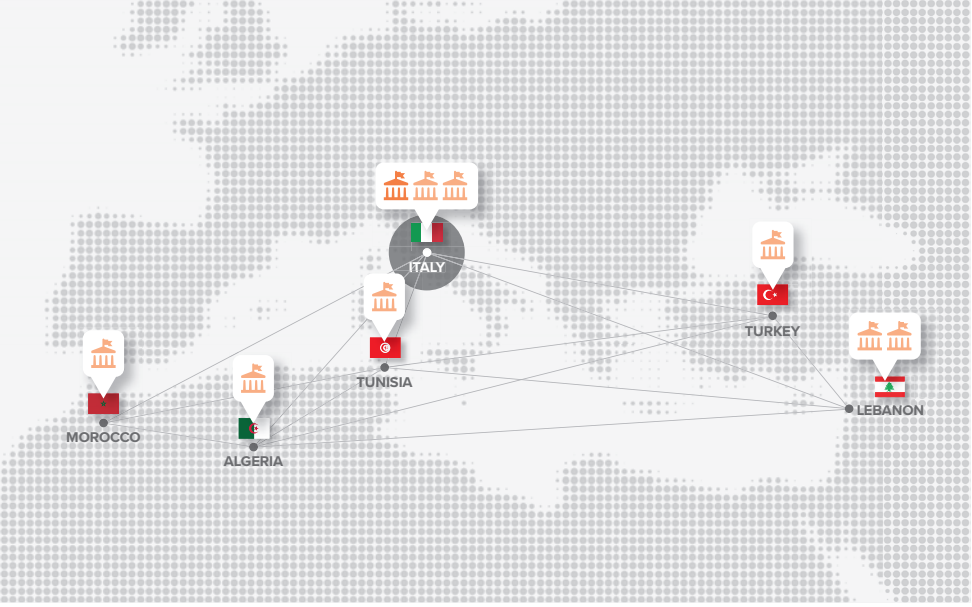
Development of new wheat-derived foods of the Mediterranean diet with improved nutritional and health value

Context

Noncommunicable diseases (NCDs), comprising essential pathologies such as cardiovascular diseases, cancer, chronic respiratory diseases and diabetes, account for most deaths worldwide (71%), making their prevention a significant challenge for sustainable development as planned in the 2030 Agenda.
Among the key risk factors for NCDs incidence, the World Health Organization identified some incorrect dietary behaviors based on the excessive consumption of ready meals, rich in sugar and fat, and low in essential nutrients. In this scenario, it is highly desirable to boost the "Mediterranean diet" (Med-Diet), known to be more beneficial for human health by preventing NCDs, when compared with other dietary patterns. The health issues associated with incorrect diet habits arising from modern stressful lifestyles have not spared populations in the Mediterranean area. Therefore, it is urgent to adopt actions to answer people's needs for fast foods and the health value of locally traditional diets. For this purpose, MEDWHEALTH will redesign a selection of typical Med-Foods along with a pool of niche-regional foods by using innovative raw materials, namely durum wheat, barley and lentils, products of specific breeding programs focused on the biofortification in healthy compounds such as dietary fiber and proteins.

Objective and contents

The first objective of MEDWHEALTH is to improve the nutritional value of durum-based foods that are traditional to the Mediterranean area by using the following innovative materials: i) high amylose durum wheat, to improve RS content, antioxidant, and anti-inflammatory properties; ii) soft durum wheat, to enhance sustainability, nutritional and technological quality; iii) meal flours from other cereals and legumes, to boost mineral, protein and fiber content. Another issue is the reduction of anti-nutritional components, such as phytic acid and flatulence-causing oligosaccharides, as caused by pulse pre-malting. The second objective of the project is to evaluate the effects of the innovative Med-Foods on human health. For this purpose, the newly developed products will be tested in clinical studies on subjects with low to



Other Entities/ 8

Consiglio Nazionale delle Ricerche (CNR), Istituto di scienze delle produzioni alimentari, Italy
Scientific Officer:
LADDOMADA, Barbara

Promolog srl, Italy
Scientific Officer: DA RE, Lorena

Institute National de la Recherche Agronomique d'Algeria (INRA), Algeria
Scientific Officer:
BENBELKACEM, Abdelkader

ICARDA, Lebanon
Scientific Officer: VISIONI, Andrea

Lebanese Agricultural Research Institute, Lebanon
Scientific Officer: EL AMIL, Rola

Institut National de la Recherche Agronomique, Morocco
Scientific Officer: JILAL, Abderrazek

Institut National de la Recherche Agronomique, Tunisia
Scientific Officer: BEN GHANEM, Hajer

Istinye University, Turkey
Scientific Officer: KOKSEL, Hamit

moderate symptoms of chronic metabolic and inflammatory disease, where main health parameters will be measured. The last objective of MEDWHEALTH is to identify critical elements practical to manage the future business linked to the diffusion of the new food products. Information and data gathered from fields, laboratories, and pilot processing plants will be used to assess the new products' production costs and environmental impact. These data are aimed to evaluate the pros/cons of a new value chain based on re-formulated Mediterranean products.
Women cooperatives in Morocco, Lebanon, Turkey, Algeria, and Tunisia will be trained on new recipes. Their feedback will be important in refining the products to ensure their acceptance in the local diets. Their active participation in the project is intended to contribute to women emancipation in Med-countries according to gender.

Expected impact and results

MEDWHEALTH aims to impact the wellness of Mediterranean people by improving health, social and economic conditions. MEDWHEALTH will establish a novel durum wheat-based food chain producing traditional Mediterranean foods enriched in healthy compounds by employing local workers' knowledge and skills, mainly focusing on women, thus contributing to their social power. A set of foods from Med-Diet re-designed with enhanced bioactive content will be developed: semolina, pasta, couscous, bulgur, freekeh, leavened and flatbreads, snacks (frise and taralli), tarhana (fermented soup base), bsissa, azenbou, boumeghlouth, mermez, biscuits with reduced glycemic index and high protein content.
Regarding health, MEDWHEALTH will produce new food products of the Med-Diet with "healthy" attributes, resulting in positive impacts on human health, preventing the onset of NCDs. At social and economic levels, the project will improve the competitiveness of the participant countries across the entire agri-food value chain, providing new market opportunities. The main stakeholders of the supply chain (e.g., farmers, millers, Med-Foods's producers) will benefit from the availability of products with higher added health. Moreover, the participation of women cooperatives will contribute to increasing decision-making power and leadership for women involved in the project.



13
new wheat-derived foods of the Mediterranean diet
developed with the support of local women's cooperatives

Thematic Area

Nexus

Section I

Topic - Demonstrating benefits of the Water-Ecosystem-Food Nexus approach in delivering optimal economic development, achieving high level of environmental protection and ensuring fair access to natural resources

Action

IA - Innovation Action

Budget

2.998.000 €

Duration

36 months

State and Coordinator Entity

ITALY

Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria (CREA),
Centro di Ricerca Politiche Agricole e Bioeconomia

Scientific Officer:
FABIANI, Stefano

Participating States/ 6

Research Units/ 13

Section I

14. LENSES

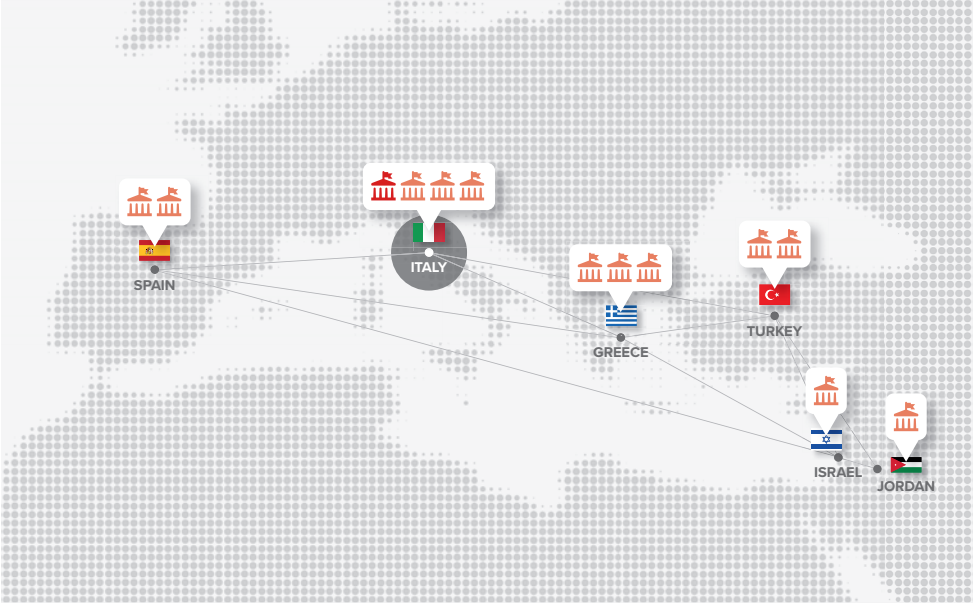
Learning and action alliancEs for NexuS EnvironmentS

Context

In the last decades, significant efforts have been made to facilitate the understanding of the Water-Ecosystem-Food production nexus as a conceptual approachable to guarantee security in the management of natural resources in line with the principles of sustainable development. Going beyond a scientific understanding of the nexus concept, it is necessary to encourage collective learning processes through engagement active, inclusive, and equitable of all decision-makers and stakeholders involved in the management of water resources in agriculture, considering at the same time the results in terms of food production and the protection of ecosystems.
Therefore, what is needed is adequate tools to analyse and manage the synergies between the sectors concerned to obtain integrated and sustainable resources management at the territorial level.
The concept of nexus takes place within the constraints of renewable natural resources and recognises complex systems' uncertainty. LENSES will create and mobilise broad partnerships that use tools and methods to support cross-sectoral policies, integrates, and informed decisions on adaptation measures through monitoring and evaluation cycles.

Objective and contents

The main aim of LENSES is, therefore, to improve the understanding of WEF systems to reveal their complexity and manage their uncertainty about their dynamic evolution. Address uncertainty and understand is essential for building Nexus sustainable systems and adapting quickly to changes and variations.
Through the activation of collective learning, LENSES, therefore, plans to build resilient nexus systems capable of coping with changing context conditions (climate change, social mutations, variation of available technologies), developing adaptive capacities capable of involving everyone: the sectors involved, from the political level to the territorial level, to the business system.
All this favouring mainly a bottom-up approach involving local communities and the various target groups of the company, including businesses.



Other Entities/ 15

Università degli Studi di Padova, Dipartimento Territorio e Sistemi Agro-Forestali, Italy
Scientific Officer: PETTENELLA, Davide

Consiglio Nazionale delle Ricerche (CNR), Istituto di Ricerca sulle Acque, Italy
Scientific Officer: PAGANO, Alessandro

ETIFOR srl, Italy
Scientific Officer: LEONARDI, Alessandro

AgriSat Iberia SI, Spain
Scientific Officer: OSANN, Anna

ECOADAPT, Spain
Scientific Officer: BEA MARTINEZ, Manuel

Ellinikos Georgikos Organismos - Dimitra, Greece
Scientific Officer: PANAGOPOULOS, Andreas

Technical University of Crete, Polytechneio Kritis, Greece
Scientific Officer: NIKOLAIDIS, Nikolaos

Draxis Environmental SA, Greece
Scientific Officer: KAPETAS, Leon

MIGAL Galilee Research Institute Ltd, Israel
Scientific Officer: MARCHAIM, Uri

National Agricultural Research Center (NARC), Jordan
Scientific Officer: AWABDEH, Sami

International Agricultural Research and Training Center, Turkey
Scientific Officer: TOPDEMIR, Tuncay

EA-TEK International R&D, Engineering, Software and Consultancy Company, Turkey
Scientific Officer: GUL, Ali

More in detail, in the first phase, the boundaries of the reference system (intrinsic characteristics) will be defined by activating processes of organisation and cooperation (LAAs - Learning and Action Alliances) and developing collective learning models (PSDM - Participatory System Dynamic Models) thus defining scenarios/strategies shared with stakeholders at various levels.
This proposed approach will be implemented through specific case studies in the six pilot areas representative of the leading agricultural and geographical characteristics of the Mediterranean basin. It will consider the specificities of the Mediterranean region.

Expected impact and results

The project's main results will be to contribute to the development of an operational approach to the interconnected management of water-ecosystems-food. The main results are also to guarantee the feasibility and replicability of the demonstration cases; create strong cross-sectoral links between institutions, including grassroots beneficiaries and relevant public authorities governing the Nexus approach; allow the achievement of SDGs interconnected with the WEF Nexus concept at different levels of governance; strengthen scientific capacities and the creation of collaborative space in the WEF Nexus perspective throughout the Mediterranean region.
Using participatory approaches to support the development of collective learning processes in decision-making and policymaking will help overcome conflicts in using sectoral resources. By explicitly considering multiple stakeholders' needs, preferences, interests, and objectives, the project results will represent fundamental input for political decision-makers, subjects in charge of territorial planning, bodies managing water resources (basin/district authorities) reclamation consortia.

Development of processes of organisation and cooperation and collective learning models

6 pilot areas


Plinios catchment area


Guadalquivir basin


Gediz basin


Middle Jordan Valley


Hula Valley

Thematic Area

Nexus

Section I

Topic - Demonstrating benefits of the Water-Ecosystem-Food Nexus approach in delivering optimal economic development, achieving high level of environmental protection and ensuring fair access to natural resources

Action

IA - Innovation Action

Budget

2.850.000 €

Duration

36 months

State and Coordinator Entity

ITALY

Università per Stranieri di Perugia, Water Resources Research and Documentation Center

Università per Stranieri di Perugia

Scientific Officer:
NARDI, Fernando

Participating States/ 7

Research Units/ 13

Section I

15. NEXUS-NESS

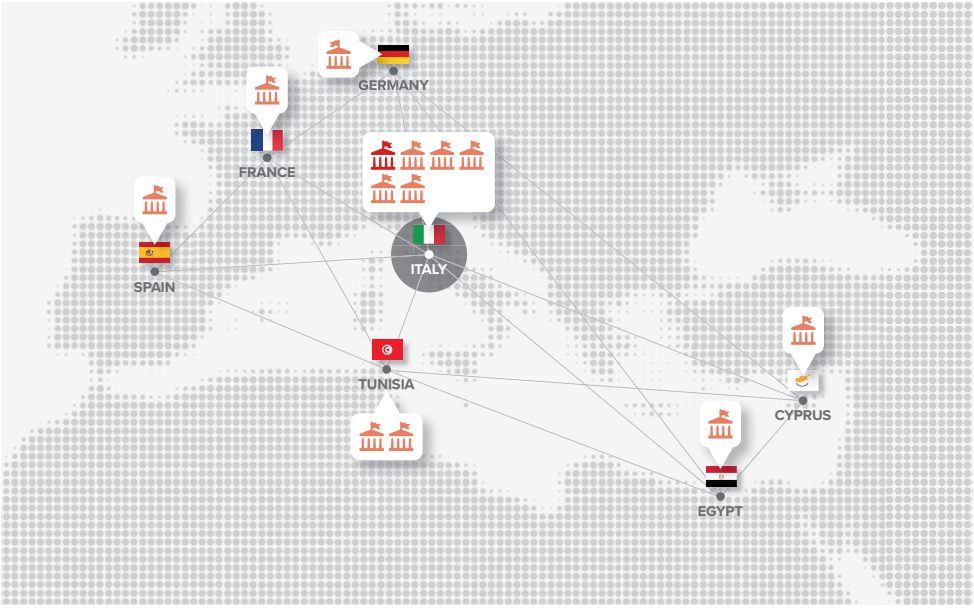
NEXUS Nature Ecosystem Society Solution: Fair and Sustainable Resource Allocation Demonstrator of the Multiple WEFE Nexus Economic, Social and Environmental Benefits for Mediterranean Regions

Context

Water scarcity, climatic and demographic change stressors impact most of the Mediterranean regions. Governors are called to take important decisions to support a fair allocation of resources, mitigate conflicts and sustain social cohesion while managing socio-economic pressures and support environmental sustainability. Science studies validated methods and data for investigating and quantifying the interlinkages of the Water-Energy-Food-Ecosystem (WEFE) Nexus components providing solid proof of the fundamental importance of embracing a Nexus approach. Nevertheless, WEFE Nexus knowledge and technology transfer is still falling behind. Several technical and non-technical barriers still avoid the transition towards WEFE Nexus approaches. Multi-Sector (among different economic - growing and often resource competing - sectors), Multi-Disciplinary (merging efforts of earth/environment and social sciences towards transdisciplinarity) and Multi-Actor (i.e. Multi-Stakeholder also including citizens) cross-cooperation and mutual trust are still lacking in actual water and land management strategies. Social and economic governing dynamics are still bounded within sector-confined decision-making frameworks. Heterogeneous data, different solutions and unbalanced policies characterize water, energy, food and ecosystem management strategies that tend to overlap rather than work in synergy. Stakeholders and citizens are not adequately informed and involved perceiving to receive technological and policy advancements as top-down enforcement, like a burden, rather than understanding their multiple benefits towards safer and healthier water, energy, food production.

Objective and contents

The NEXUS Nature Ecosystem Society Solution or NEXUS-NESS solution aims to co-produce and co-test with stakeholders WEFE Nexus management plans for fair and sustainable allocation of resources. NEXUS-NESS will produce trans-disciplinary datasets and scenarios that integrate a core WEFE nexus model, based on large-scale WATNEEDS and river basin scale FREEWAT eco-hydrological models for building an operational NEXUS-NESS Service (NNS) transferring science-driven



Other Entities/ 12

Università degli Studi di Firenze, Dipartimento di Ingegneria Civile e Ambientale, Italy
Scientific Officer: CAPORALI, Enrica

Politecnico di Milano, Dipartimento di Ingegneria Civile e Ambientale, Italy
Scientific Officer: CHIARELLI, Davide Danilo

Università Sant'Anna di Pisa, Istituto di Scienze della Vita, Italy
Scientific Officer: ROSSETTO, Rudy

Urby et Orbit srl, Italy
Scientific Officer: LASCIALFARI, Giulio

Fondazione Eni Enrico Mattei, Italy
Scientific Officer: HAFNER, Manfred

DESIGN & DATA GmbH, Germany
Scientific Officer: MARCU, Sebastian D.

XPRO Consulting Limited, Cyprus
Scientific Officer: SCHNEIDER, Xenia

Alexandria University, Egypt
Scientific Officer: BAHNASSY, Mohamed

Universidad Politécnica de Madrid, Spain
Scientific Officer:
RODRIGUEZ SINOBAS, Leonor

Sol Agro et Hydrosystème Spatialisation, France
Scientific Officer:
CUDENNEC, Christophe

Institut des Régions Arides, Tunisia
Scientific Officer: OUESSAR, Mohamed

Commissariat Régional au Développement Agricole, Tunisia
Scientific Officer: SALAH, M'hemdi

WEFE Nexus knowledge to address real case issues. Multi-Sector trans-disciplinary approaches will empower the NEXUS-NESS solution that will interlink the WEF Nexus components with a three-fold conceptualization of the Ecosystem component (Environment, Economy, Engagement/Society). NEXUS-NESS will operationalize adopting a WEFE Nexus bottom-up approach in four different climatic, environmental, socio-economic and cultural WEFE Nexus case studies employing Living Lab and Responsible Research And Innovation (RRI) principles (namely the RRI Roadmap). Four Nexus Ecosystem Labs (NELs) in Italy, Spain, Egypt and Tunisia will be set up. A WEFE Nexus Innovation Ecosystem Approach (IEA) supported by a novel Multi-Stakeholder and User Platform will effectively engage all stakeholders, including the private sector, to create long-lasting Innovation Ecosystems based on collaboration among academia and industry, different levels of the public sector and citizens.

Expected impact and results

The project NEXUS-NESS has the ambition to conceive, develop, validate and deploy WEFE Nexus Services (NNS) and WEFE Nexus management plans to address real problems co-identified with stakeholders in the four Nexus Ecosystem Labs. NEXUS-NESS will not merely conceive data, guidelines and services on paper to only understand how to tackle the significant challenges. Still, NNS will be effectively tested and demonstrated to lay a basis for realizing real change towards a WEFE Nexus strategy. The four diverse living labs of Val di Cornia in coastal Tuscany (Italy), the Duero basin (Spain), the Wadi Naghamish (Egypt) and the Wadi Jir basin (Tunisia) will share successful experiences as well as lessons learned from failed attempts engaging a wide range of WEFE Nexus governmental actors and stakeholders. The viability and replicability of the NEXUS-NESS solution will be supported by developing further demonstration cases. A novel WEFE Nexus Forum will support a roadmap for comprehensive awareness and application of the NEXUS-NESS solution to set up a collaborative WEFE Nexus space across and beyond the Mediterranean region. The project will also pave the way to new market opportunities, strengthen the competitiveness and growth of companies supported by data and tools linked to the WEFE Nexus services and management plans unveiling the multiple socio-economic and environmental benefits for society of mainstreaming Nexus compliant strategies.

Section II

Project sheets follow the order by Thematic Area
(Water management; Agricultural systems; Agri-food value chain)

Thematic Area

Water Management

Section II

Topic - Low cost, lean solutions for enhancing irrigation efficiency of small-scale farms

Action

RIA - Research & Innovation Action

Budget

1.020.180 €

Duration

36 months

State and Coordinator Entity

ITALY

Consiglio Nazionale delle Ricerche (CNR), Istituto per la Bioeconomia

Consiglio Nazionale delle Ricerche
Istituto per la BioEconomia
Dipartimento di Scienze Bio Agroalimentari

Scientific Officer:
MATESE, Alessandro

Participating States/ 5

Research Units/ 7

Section II

1. DATI

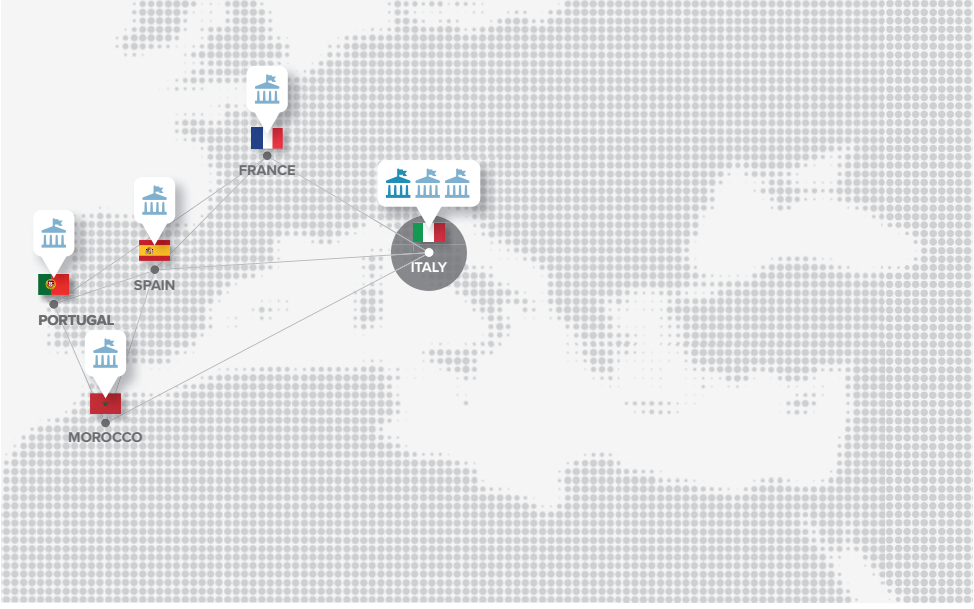
Digital Agriculture Technologies for Irrigation efficiency

Context

Water is becoming the most limiting factor for crop production, with irrigated agriculture being one of the main water-consuming sectors, which is a challenge for substantial water savings. The continuous technological development has made available to the farmer innovative technical solutions (TS) capable of optimising water use according to a precision irrigation approach that minimises water waste according to the needs detected in the soil-plant system. The monitoring system represents a critical issue between the technologies involved. There are many solutions on the market; however, frequently, the costs and complexity of these systems do not allow them to be widely used by medium-small companies. These are often proprietary systems with non-open technology, which further limit the flexibility of use. This represents a significant problem, especially for agricultural realities in developing countries, which find it challenging to apply sustainable techniques for water resources. In addition, given that these companies are often placed in climatic contexts characterised by drought and water scarcity, finding a solution to this problem becomes a priority.

Objective and contents

The DATI project aims to develop and implement new Digital Agriculture (DA) technological solutions and innovative digital procedures. To enhance irrigation efficiency by developing low-cost and lean solutions for small-scale farmers, primarily using low-cost hardware simplified data-driven models. The DATI project will take advantage of innovative low-cost technologies such as Wireless Sensors Networks (WSN) for agrometeorological monitoring, Unmanned Aerial Vehicles (UAV) coupled with different sensors, free satellite imagery, decision support systems (DSS). The systems will be developed in pilot demo farms located in five representative Mediterranean countries: Italy, Portugal, Spain, France, and Morocco. The technological components will be affordable, flexible, and adaptable to be replicated in different locations and applied to other crops and farming systems. More specifically, each technical solution will be developed as a lean package and support Mediterranean small-scale farmers. It aims at increasing the profitability of irrigation and achieve optimal crop yields while



Other Entities/ 6

Terre Regionali Toscane, Italy
Scientific Officer: BOTTAZZI, Paolo

Consorzio di Bonifica 6 Toscana Sud, Italy
Scientific Officer: CHIARELLO, Valentina

Consejo Superior de Investigaciones Científicas (CSIC), Institute of Agricultural Sciences, Spain
Scientific Officer: PEÑA, Jose M.

SupAgro - UMR ITAP, L'Institut Agro, France
Scientific Officer: TISSEYRE, Bruno

Université Mohammed I, Faculté Pluridisciplinaire de Nador, Morocco
Scientific Officer: ABERKANI, Kamal

University of Trás-os-Montes and Alto Douro, Portugal
Scientific Officer: SOUSA, Joaquim

ensuring water quality and quantity through the optimisation of water use efficiency with a low-cost approach.

Expected impact and results

Applying the tools developed during this project will reduce water use between 15-20% compared to conventional irrigation management. Moreover, DATI will save water without any decrease in crop yield by increasing the water use efficiency through more precise use of the water amount applied to the crops at the right location and time.

	Tech Solution #1	Tech Solution #2	Tech Solution #3	Tech Solution #5	Mixed Tech Solution #5
					
Crop	Perennial crop	Annual crop	Perennial crop	Perennial crop	Perennial and annual crop
Sensing Platform	UAV Multispectral	WSC AgroClimatic	UAV Thermal	RGB Mobile Device	UAV Multispectral Satellite Multispectral UAV Thermal WSC AgroClimatic RGB Mobile Device

SPECIFIC OBJECTIVES

- Low-cost: choosing, adapting, or developing TS capable of maintaining the operational level in harsh in-field conditions, guaranteeing reliability and durability, with minimal maintenance.
- Off-the-shelf: the developed TS must be cheap but also very easy to install and user friendly to reach the broadest audience related to small farms in very different social, economic, and geographical contexts.
- Straightforward & Integrated DSS: DATI's final goal is to have a platform capable of seamlessly integrate data from different sources and guarantee their interoperability.
- Market analysis and Replication: The DATI project is designed to be easily upscaled and targeted to different crops and agriculture systems.
- Participatory approach: the message must be that farmers can increase their yield and improve their crops' quality while using water more efficiently. Political and state-run institutions should be kept in the loop and provide valuable contextual information from the different regions, along with each project partner.

Thematic Area

Water Management

Section II

Topic - Low cost, lean solutions for enhancing irrigation efficiency of small-scale farms

Action

RIA - Research & Innovation Action

Budget

897.226 €

Duration

36 months

State and Coordinator Entity

SPAIN

Instituto Valenciano de Investigaciones Agrarias

ivia
Instituto Valenciano de Investigaciones Agrarias

Scientific Officer:
PEREZ-PEREZ, Juan Gabriel

Participating States/ 5

Research Units/ 9

Section II

2. HANDYWATER

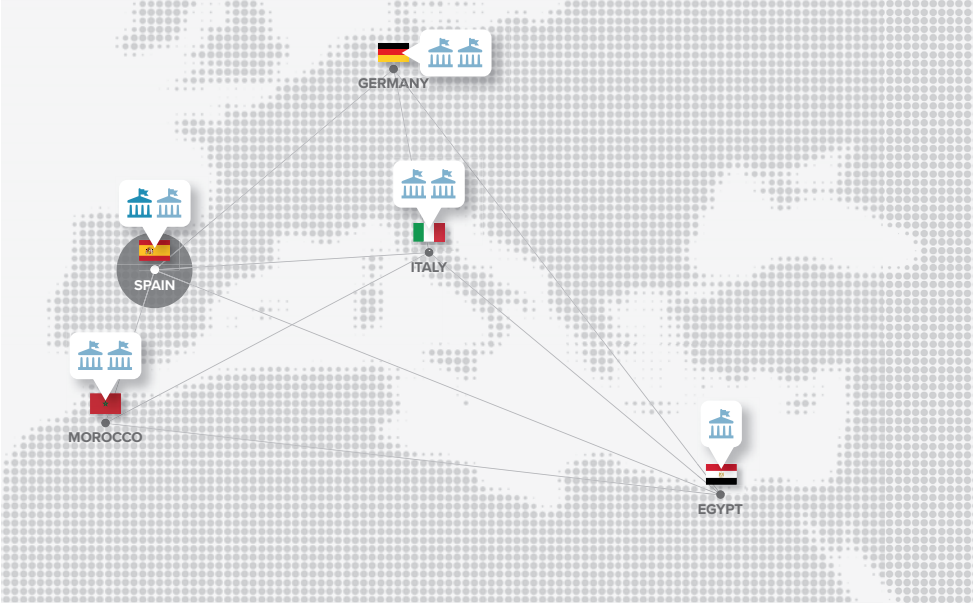
Handy tools for sustainable irrigation management in Mediterranean crops

Context

In the EU agriculture structure, small farms represent two-thirds (67.6%) of the farm's utilised land share. Thus, smallholders act as a crucial part of the Mediterranean agricultural community. The Mediterranean region could save 35% of water by implementing more efficient irrigation and conveyance systems. To achieve a water-efficient agricultural sector, new irrigation technologies and best practices need to be adopted. The challenge is to widen efficient irrigation technologies and practices among small farmers to increase crop production, income, and household food security. Therefore, the HANDYWATER project will develop new solutions focused on a bottom-up approach, better reflecting the quantitative knowledge of farmers' current practices about actual and potential crop water use, allowing to translate water-efficient practices on a case-by-case basin into farmers practices and adapted to the crop needs. In the HANDYWATER project, cooperation with water user organisms and small farmers will be crucial in learning and sharing knowledge. This will open up opportunities to integrate local knowledge and traditional production elements to improve the profitability of irrigation through the adoption of lean irrigation technologies to generate income for smallholders in the Mediterranean area.

Objective and contents

The general aim of the HANDYWATER project is to improve water use efficiency in Mediterranean agriculture. In this sense, the project is focused on gaining new knowledge and offering low-cost and lean solutions for enhancing the adoption of efficient irrigation innovations by small farmers, for increasing the environmental and economic sustainability of two different crop production models, both high waters demanding and widely cultivated in the Mediterranean area, such as citrus (as intensive system) and olive (as a rainfed system). This goal will be primarily achieved by conveying existing and innovative irrigation technologies and water-saving practices to develop a decision support tool (DST) that will consider the soil-plant-atmosphere (SPA) continuum interactions to enhance irrigation efficiency and management.



Other Entities/ 8

Asdron Spain SL, Spain
Scientific Officer: CASES, Santiago

Helmholtz Centre for Environmental Research, Germany
Scientific Officer: WERBAN, Ulrike

IAK Agrar Consulting GmbH, Germany
Scientific Officer: SCHNEIDER, Martin

Benha University, Egypt
Scientific Officer: ABBAS, Hassan

Università degli Studi di Catania, Dipartimento di Agricoltura, Alimentazione e Ambiente, Italy
Scientific Officer: CONSOLI, Simona

IRRITEC spa, Italy
Scientific Officer: GIARDINA, Giuseppe

Institut Agronomique et Vétérinaire Hassan II, Morocco
Scientific Officer: EL OMARI, Hicham

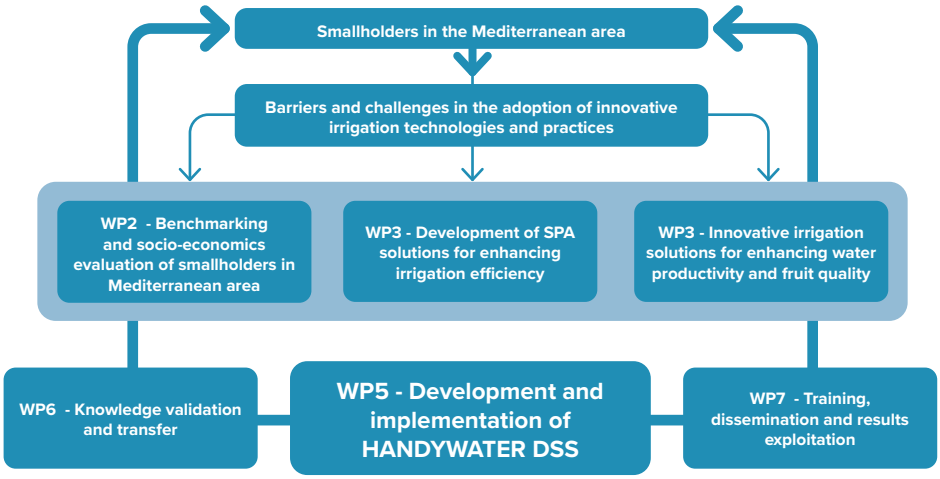
Ibn Zohr University, Morocco
Scientific Officer: FALLAH, Mohamed

SPECIFIC OBJECTIVES

- Identifying and boost low-cost crop monitoring technologies by introducing innovative SPA measuring techniques based on the use of low-cost sensors;
- Quantifying socioeconomic and environmental benefits of the irrigation practices, by analysing their economic and financial aspects in order to evaluate their contribution in the development of the Mediterranean small farmers' context;
- Optimising the management of the crop at farm scale by identifying and boosting emerging soil and plant monitoring technologies and novel techniques based on remote and proximal sensing tools and GIS applications;
- Redesigning new water-saving solutions for improving irrigation efficiency and economic benefits of Mediterranean crops, by introducing innovative irrigation technologies combined and integrated with water-saving practices;
- Developing and easy-to-use DST to offer irrigation recommendations based on a "traffic light", favouring the output interpretation and understandability for the end-users;
- Testing and evaluating the DST tool in different scenarios;
- Overcoming barriers in the adoption of innovative irrigation technologies and practices, by creating a network of cooperation between the farmers and the project consortium by iterative co-learning approaches and farmer-to-farmer learning.

Expected impact and results

HANDYWATER project aims at providing results both at scientific and practical levels. It will develop and promote the most promising innovative irrigation technologies for improving water management for specific crop systems. The performance of the proposed innovative irrigation technologies will be ensured by using handy monitoring protocols and procedures. Implementing these lean monitoring systems will develop a mobile, efficient, and cost-effective exploration strategy while using optimised field sensors technologies. HANDYWATER consortium will strengthen the capacities of small-scale farmers by assisting and guiding them towards the sustainable use of modern technologies for more efficient and effective agricultural production. Specifically, the project will promote close cooperation and co-learning strategies between local stakeholders and the project consortium by valorising the small-scale farmers' experience in "on-field" water-saving activities. HANDYWATER will also promote Euro-Mediterranean multi-level stakeholder/actor networks for improving governance-related capacity in agricultural water and agro-food systems, integrating and bridging different (and opposite) interests and stakes. The environmental outcomes of the adoption of suitable irrigation practices by the small farmers will permit to optimisation of agricultural inputs, reducing the water (up to 20%) and energy consumption. The proposed irrigation solutions will also enable the design of profitable agricultural systems for small-scale agriculture, enabling a sustainable and efficient market capacity for smallholder farmers and the increasing competitiveness of companies. From a social point of view, the HANDYWATER innovative irrigation solutions developed will promote qualified technical jobs and the economic sustainability of small farms in rural areas, contributing to balanced territorial development, especially in the most vulnerable regions, with the higher potentiality of social benefits, including the creation of new jobs.



Thematic Area

Water Management

Section II

Topic - Low cost, lean solutions for enhancing irrigation efficiency of small-scale farms

Action

RIA - Research & Innovation Action

Budget

1.038.680 €

Duration

36 months

State and Coordinator Entity

FRANCE

Universite de Pau et des Pays de l'Adour, Laboratoire d'Informatique

Scientific Officer:
PHAM, Congduc

Participating States/ 5

Research Units/ 8

Section II

3. INTEL-IRRIS

Intelligent Irrigation System for Low-cost Autonomous Water Control in Small-scale Agriculture

Context

According to FAO, small-scale farming contributes to food security and the rural economy. However, smallholders usually face several constraints impeding their productivity, profitability and contribution to economic growth. The water resource is one of the significant constraints, and the situation is foreseen to worsen due to water shortage concerning current excessive use and climate change. Controlled and improved irrigation can save water while maximizing plant growth and yield. The project will provide the smallholder farmers with more efficient management of their available water by deploying an open, low-cost and autonomous irrigation control system based on IoT and intelligent technologies. The irrigation process to decide/suggest how much water is needed to maintain the optimal production potential without water wasting can be adapted (i) for a particular crop, (ii) at a particular moment and (iii) for a given soil type and condition because it will be seconded by algorithms predicting the behaviour of the complex soil/plant/atmosphere system.

Objective and contents

The goal of Intel-IrriS is to save water and increase water usage efficiency while considering the specificities of socioeconomic contexts of smallholder farmers and current irrigation practices. Existing solutions are generally costly and provide raw data that small farmers cannot use directly.
Therefore, Intel-IrriS main objectives are (1) to reduce the cost of intelligent technologies for smallholders – dividing the cost by a factor between 10 and 100, (2) to increase adoption of innovative technologies by smallholders by "translating" raw data into readable information used for deciding on irrigation adjustment and (3) to increase on a long-term the smallholders' sustained production and income, as well as the local innovation opportunities and capacities.
When adopting a low-cost design approach, the reliability and accuracy of the collected data can dramatically limit the efficiency of the deployed system. Intel-IrriS will propose a low-cost water control system.

Other Entities/ 7

Institut d'Écologie et des Sciences de l'Environnement de Paris, France
Scientific Officer: HARTMANN, Christian

Université Oran 1, Laboratoire Informatique Industrielle et Réseaux, Algeria
Scientific Officer: KECHAR, Bouabdellah

Université A. Ibnbadis Mostaganem, Algeria
Scientific Officer:
BENKHELIFA, Mohammed

WAZIUP eV, Germany
Scientific Officer: RAHIM, Abdur

Agricultural University of Athens, Greece
Scientific Officer: BARTZANAS, Thomas

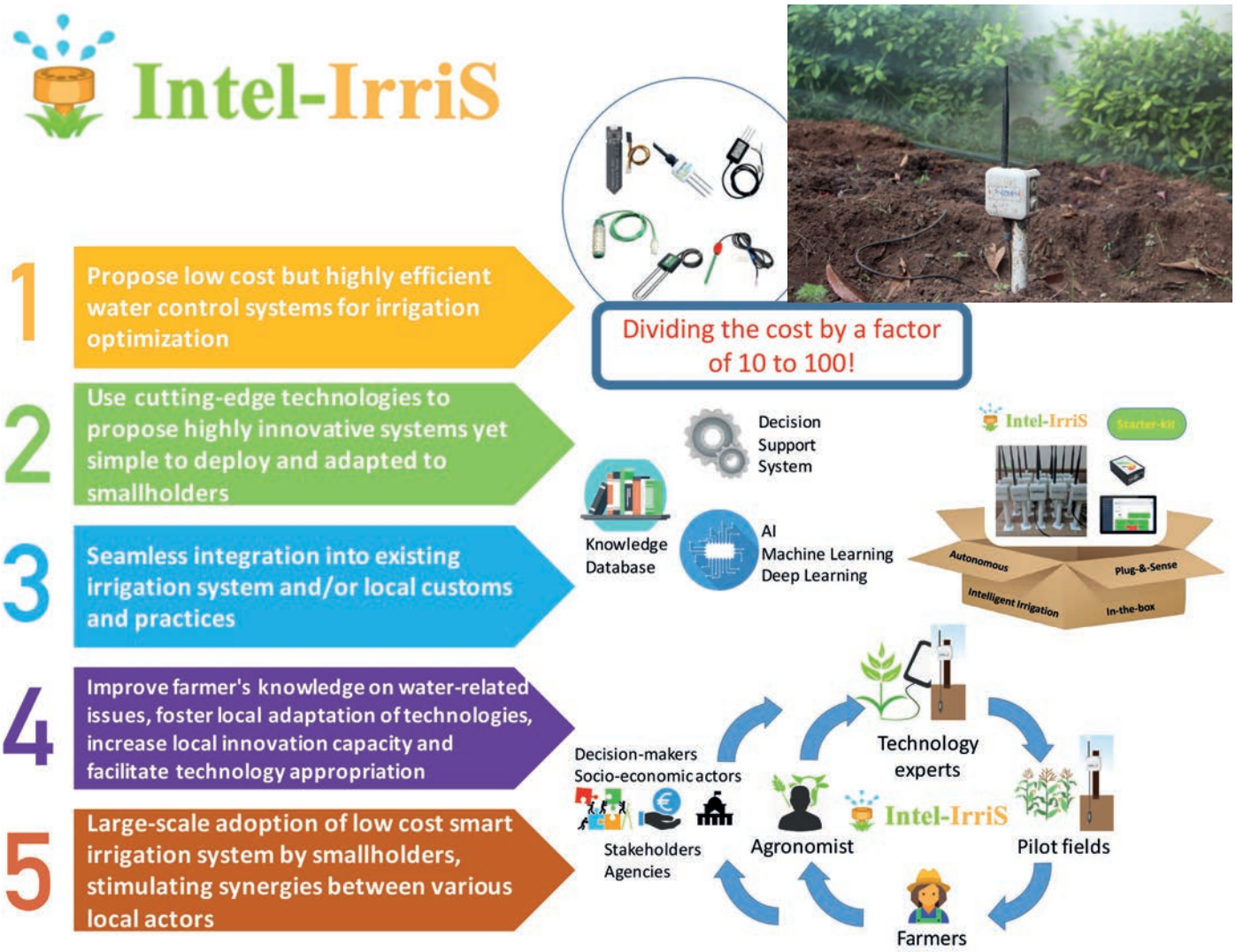
École nationale des sciences appliquées de Safi, Morocco
Scientific Officer: BARAKA, Kamal

Institut National de la Recherche Agronomique, Morocco
Scientific Officer:
BENABDELOUAHAB, Tarik

Still, they will improve its efficiency: (1) by enabling the deployment of several complementary low-cost sensors, (2) by using the automatic and advanced calibration of the different sensors to increase accuracy and (3) by including agricultural models/knowledge with corrective & predictive analytics.

Expected impact and results

Intel-IrriS's low-cost connected sensors use long-range and low-power radio technologies to efficiently implement water-related remote sensing, significantly reducing the deployment complexity by end-users.
Thus, by simplifying the usage of cutting-edge technologies, Intel-IrriS contributes to accelerating the transition towards using more efficient and effective irrigation systems in small-scale farms.
Intel-IrriS' approach for smallholders is to use embedded (i.e., local) Decision Support Systems and AI-processing to enhance the efficiency of irrigation systems, thus contributing to water-saving to achieve high-efficiency underwater quantity constraints.
For instance, Intel-IrriS uses advanced water-soil-plant interaction models and advanced algorithms for low-cost sensor calibration for water status and soil-water productivity. Local weather data can also be integrated to determine evapotranspiration better. In addition, Intel-IrriS's control system with embedded Decision Support Systems can integrate open data such as weather or satellite data to enrich the prediction system.



Thematic Area

Water Management

Section II

Topic - Low cost, lean solutions for enhancing irrigation efficiency of small-scale farms

Action

RIA - Research & Innovation Action

Budget

1.038.229 €

Duration

36 months

State and Coordinator Entity

SPAIN

Consejo Superior de Investigaciones Científicas, Instituto de Recursos Naturales y Agrobiologia de Sevilla

CSIC
CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

Scientific Officer:
DIAZ-ESPEJO, Antonio

Participating States/ 5

Research Units/ 7

Section II

4. IRRIWELL

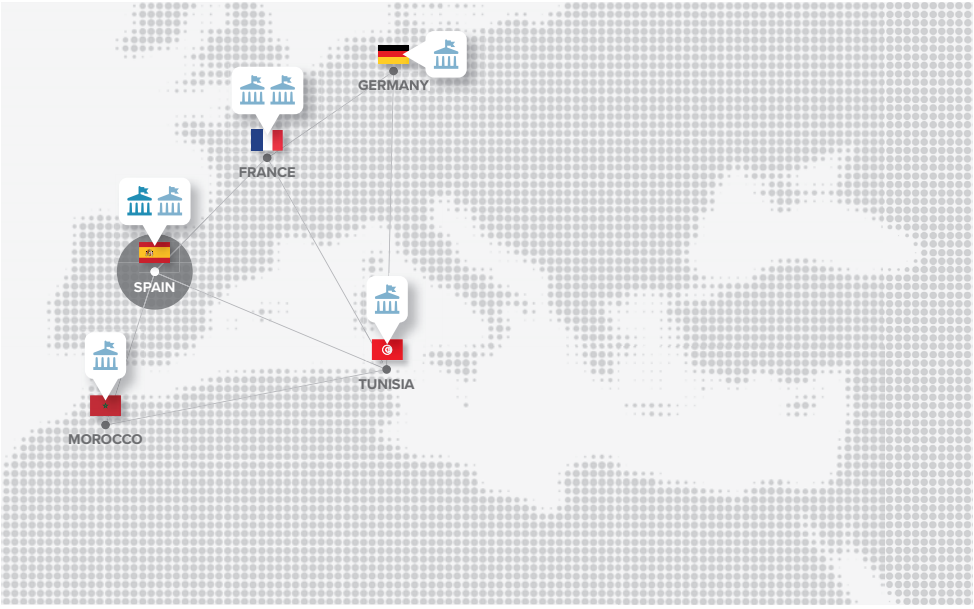
A novel plant-based approach to estimate irrigation water needs of orchards for an optimal water management

Context

Fruit, wine and olive oil production are critical sectors within the EU economy, society, and environment account for about 13% of the total economic output of the agri-cultural industry (EUROSTAT) and provide nutritional benefits to citizens, including prevention of essential diseases. Water scarcity and increased evapotranspiration requirements are severe challenges for Mediterranean agriculture in climate change and jeopardise the future supply of many crop productions. As this risk threatens perennials and fruit tree crops, growers need rational strategies to improve their orchards water use efficiency. Although much progress has been made in irrigation water methods and systems to enhance irrigation efficiency, the reality shows that this technology has not reached the smallholder farms that sustain a high proportion of fruit production in the EU. IRRIWELL will focus directly on the two issues identified in the PRIMA Topic which reduce the adoption of this technology by farmers: the need for high skills requested to master the technology and the high cost for their imple-mentation.

Objective and contents

The main goal of IRRIWELL is to test the implementation of a novel approach to es-timate water requirements of fruit trees based on stomatal conductance with the aid of plant sensors and mechanistic physiological models and facilitate the performance of a decision support system by small farmers. Stomatal conductance is crucial for assessing water consumption in trees and a unique means to bridge the carbon and water cycles and link water consumption to production.
Automatic estimation of stomatal conductance can be achieved by combining ad-equate plant sensors (turgor-related or sap flow) with mechanical models. Stomatal conductance is used for two purposes: together with plant leaf area to estimate water consumption and decide the optimal irrigation amount, including applying the deficit irrigation strategy, based on its tight correlation with photosynthesis. Still, a second issue must be solved: sensors will be limited to a few trees, and we need to handle heterogeneity in the orchard.



Other Entities/ 6

VerdeSmart, Spain
Scientific Officer: ÁLVAREZ, Rafael

ATB Leibniz-Institut für Agrartechnik und Bioökonomie eV, Germany
Scientific Officer: ZUDE-SASSE, Manuela

Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement (INRAE), France
Scientific Officer: COURAULT, Dominique

CESBIO Centre d'Études Spatiales de la Biosphère, France
Scientific Officer: LE DANTEC, Valérie

Université of Cadi Ayyad, Morocco
Scientific Officer: EZZAHAR, Jamal

Institut de l'Olivier, Tunisia
Scientific Officer: LARBI, Ajmi

This will be addressed by using GIS web platforms with remote sensing data to estimate the seasonal leaf area index based on NDVI values.

Expected impact and results

The main effect foreseen by IRRIWELL is to improve the farm productivity and profitability through the reduction of costs and the increase of the crop yield with a solution that minimises the environmental impact due to the sustainable use of resources (water and energy consumption), to provide a solution to manage deficit irrigation. At the same time, feasible business models are generated from the different farming scenarios. IRRIWELL offer a promising concept to improve irrigation practices. The deployment of the services using IoT technologies open the gate to other application that can be fostered by the success of IRRIWEL and its adoption by a large community of users. Thus, beyond the direct impact generated by the increase in farm profitability thanks to the innovative services developed in IRRIWELL, we can foresee the development of new services that can have a more significant impact on the whole agro-food ecosystem: farmers, businesses, citizens/society, public authorities, and external communities. This is intended to translate into marketable products and services previous results of different irrigation scheduling options and highlight direct and indirect embedded benefits that make the user think beyond water savings.

A novel approach to estimate water requirements of fruit trees based on stomatal conductance

Thematic Area

Water Management

Section II

Topic - Low cost, lean solutions for enhancing irrigation efficiency of small-scale farms

Action

RIA - Research & Innovation Action

Budget

1.030.219 €

Duration

36 months

State and Coordinator Entity

GERMANY

Hochschule Wismar

Scientific Officer:
HANSMANN, Harald

Participating States/ 5

Research Units/ 8

Section II

5. MED-WET

Improving MEDiterranean irrigation and Water supply for smallholder farmers by providing Efficient, low-cost and nature-based Technologies and practices

Context

Mediterranean regions already face significant water scarcity. High tourist activities during the summer months additionally stress the limited water reserves, at a disadvantage for agriculture. Population growth, changing food consumption patterns and climate change are expected to intensify stresses. This calls for more efficient and sustainable irrigation technologies that are widely applicable for smallholder farmers. They must be low-cost, lean solutions that optimise natural resource use and income even at small scales. MED-WET provides such solutions to enhance irrigation efficiency as well as to increase freshwater availability by tapping into non-conventional water sources. Our selected solutions are low-tech, low-energy, easy-to-operate solutions using cheap, locally available and natural materials geared towards financial feasibility.

Objective and contents

The overall objective of MED-WET is to introduce and improve the irrigation efficiency of small farmers in the Mediterranean region and to make optimal use of scarce water resources for lasting food and water security. MED-WET supports smallholder farmers to adopt better practices and low-cost, sustainable solutions in irrigation and freshwater harvesting, to promote controlled water use with more crop per drop combined with more resilient and regenerative agricultural methods that restore ecosystem services for the long term, as well as contribute to more value creation in rural areas. Higher water use efficiency shall be reached through more targeted and highly decreased water consumption through innovative irrigation systems and tapping into largely unused non-conventional water resources.

Expected impact and results

MED-WET contributes to combating the adverse effects of climate change on water security, agriculture and food security in the Mediterranean. Specifically, the action increases the “Number and efficiency performance of new irrigation technologies and

Other Entities/ 7

Heliopolis University For Sustainable Development, Egypt
Scientific Officer: EL-ARABI, Tarek

Malta College of Arts, Science and Technology, Malta
Scientific Officer: BORG, Malcolm

Ministry for Agriculture, Fisheries and Animal Rights, Malta
Scientific Officer: AGIUS, Marcelle

Institut National de la Recherche Agronomique (INRA), Morocco
Scientific Officer: BOUAZZAMA, Bassou

Université Sultan Moulay Sliman, Morocco
Scientific Officer: NADYA, Wahid

Universidade Beira Interior, Portugal
Scientific Officer: LEITÃO, João Carlos Correia

Município do Fundão, Portugal
Scientific Officer: GONÇALVES, Ricardo

scheduling protocols and models" and is geared towards the achievement of SDG 6 (Clean water and sanitation), more specifically indicator 6.4.1 Change in water-use efficiency over time. MED-WET also contributes directly to SDG 13 (climate action), 1 (zero poverty), 2 (zero hunger) and 12 (responsible consumption and production). MED-WET supports the achievement of the EU Green Deal, including the 'Farm to Fork' Strategy, the Circular Economy Action Plan, and the New EU Strategy on Adaptation to Climate Change. The direct impact reaches even beyond the Mediterranean via agrifood value chains reaching all over Europe and North Africa.

Expected impacts beyond those mentioned in the Work Programme:

- Innovation capacity and scientific cooperation;
- New market opportunities due to smallholder farmings' significant cut of production costs;
- Impacts on SDGs 1, 8, 9, 10;
- Potential impact on recovery after Covid-19 or other crises: rural value creation, regionalized food security and independence from food imports, local production of farming inputs, climate- and environmentally friendly, resilient food production, business models, creation of new 'sustainable' jobs in otherwise underdeveloped rural areas.

SPECIFIC OBJECTIVES

- Develop new irrigation technologies and solutions;
- Spread knowledge and skills to adapt, install and operate project solutions for irrigation efficiency and irrigation water production;
- Involve multiple stakeholders to tackle policy-associated barriers to take-up;
- Increase irrigation water availability by harvesting salinized and secondary sources;
- Enhance farm profitability and environmental footprints.

To achieve these objectives, all selected technologies in the MED-WET toolkit are low-tech, low-energy and easy-to-operate solutions that use cheap, locally available and natural materials and bioengineering techniques.

Thematic Area

Farming Systems

Section II

Topic - Re-design the agro-livelihood systems to ensure resilience

Action

RIA - Research & Innovation Action

Budget

641.000 €

Duration

36 months

State and Coordinator Entity

ITALY

Università degli Studi di Perugia, Dipartimento di Ingegneria Civile ed Ambientale

Scientific Officer:
PUGLIA, Debora

Participating States/ 4

Research Units/ 5

Section II

6. 4BIOLIVE

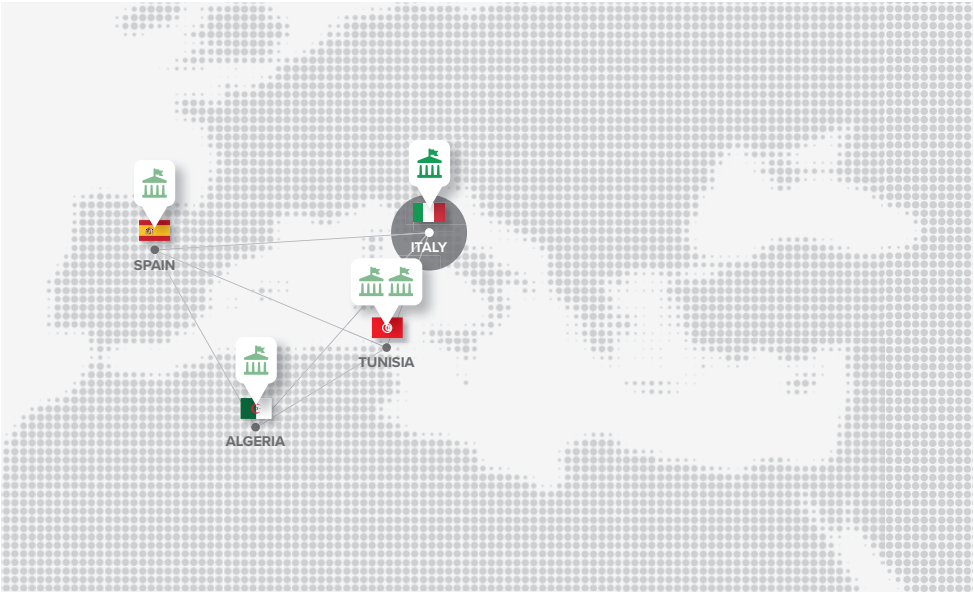
Production of Biostimulants, Biofertilizers, Biopolymers and Bioenergy from OLIVE-oil chain residues and by-products

Context

The state of the art reports a massive use of synthetic organic compounds and chemical fertilizers with a high environmental impact. The 4BIOLIVE project, aiming to reduce the carbon footprint circularly, recovers bioactive compounds and nutrients to produce biostimulants and bio-fertilizers from olive oil milling waste (olive pomace and wastewaters). It is expected that biostimulants and biofertilizers will improve their efficacy by inclusion in natural biopolymers, which will help crops to cope with the adverse effects of salinity and drought stress (conventional farming systems are severely affected by drought and salinity and therefore consume large amounts of non-renewable natural resources). 4BIOLIVE innovatively uses olive waste products, proposing an environmentally sustainable solution to promote plant growth and productivity: the combined use of nanoparticles (from lignin) and natural biopolymers will have the advantage of replacing both synthetic and non-biodegradable polymers currently used for the controlled release of fertilizer or stimulant, and effectively releasing active compounds, thanks to the nanoparticle bio-materials large surface area, easy fixation and rapid mass transfer. 4BIOLIVE will also help publicize these new agricultural practices for optimizing production in developing countries, with limited knowledge of alternative techniques to the widely established ones.

Objective and contents

4BIOLIVE, through an integrated approach, combines skills, knowledge and background from different sectors: agricultural sector (development of new biofertilizers and biostimulants to improve soil quality and protect crops from abiotic stresses and dangerous pathogens that can cause damage and economic losses in nurseries, greenhouses and open fields), materials science (through processing and characterization of biobased materials from natural sources to be used in the production of engineered nanocarriers for product treatment in the agricultural sector) and chemistry (through optimization of separation and functionalization procedures aimed at adsorbing, binding and encapsulating active ingredients on/into selected nanostructured lignin to improve their availability, stability and promote their controlled release).



Other Entities/ 4

Institute National de la Recherche Agronomique d'Algeria (INRA), Algeria
Scientific Officer: BOUCHIKH, Yamina

Universitat Politècnica de Catalunya, Spain
Scientific Officer: FERRER, Ivet

Regional Research Centre on Horticulture and Organic Agriculture, CRRHAB/IRESA, Tunisia
Scientific Officer: DBARA, Soumaya

University of Monastir, Institut Supérieur des Etudes appliqués en Humanité Mahdia, ISEAH / UM, Tunisia
Scientific Officer: KARIM, Lahmar

Expected impact and results

The project, through the valorization and innovative use of by-products from the olive chain, aims to promote the transition of the current management systems in agriculture to eco-sustainable options, to reduce the dependence on non-renewable resources by moving from a linear to a circular approach, to minimize the risk of failure associated with yield losses due to inappropriate farming systems and environmental stresses. This approach will have positive effects on the resilience, stability and robustness of the agroecosystems. The biostimulants and biofertilizers developed in 4BIOLIVE will improve soil fertility, in terms of organic matter and nutrients, through a more effective release of beneficial substances into the soil. The use of innovative biostimulation and bio fertilization materials in 4BIOLIVE, enhanced by lignin nanoparticles and biopolymers, will increase the nutritional value of crops, avoiding the negative impact of environmental stresses on their Content. Water management will benefit from the ability of innovative bioproducts to stimulate beneficial physiological responses in plants, improving their water use efficiency. These beneficial effects will increase the adaptive capacity and resilience of agricultural systems, thus reducing their vulnerability.

Innovative use of by-products from the olive chain to produce biostimulants and bio-fertilizers

SPECIFIC OBJECTIVES

- Selection and characterization of mill waste, identification of high-value ingredients and extraction of biostimulants and biofertilizers;
- Processing of raw materials and lignocellulosic fractions to obtain biostimulants, biofertilizers and carriers for controlled release of bioactive compounds, and valorization of residual biomass after extraction of bioproducts for biogas production;
- Trials to test the effectiveness of biostimulants on maise plants and, together with biofertilizers, on fruit plants;
- Adoption of environmentally, socially and economically sustainable production agroecosystems.

Thematic Area

Farming Systems

Section II

Topic - Re-design the agro-livelihood systems to ensure resilience

Action

RIA - Research & Innovation Action

Budget

1.699.351 €

Duration

48 months

State and Coordinator Entity

GERMANY

PerNaturam GmbH

Scientific Officer:
Shehata, Awad A.

Participating States/ 5

Research Units/ 9

Section II

7. Biopesticides

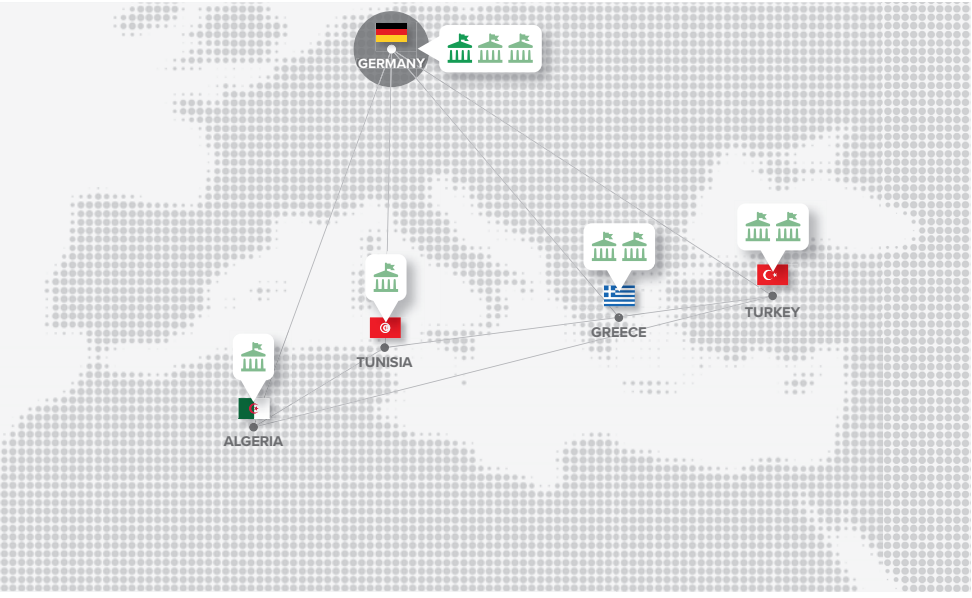
Development of Bio-Pesticides and -Herbicides for Sustainable Agricultural Crop Production

Context

Recent decades have witnessed significant growth in agrochemicals worldwide to maximize food production for a rapidly growing human population. The increased demand for food to feed the ever-growing population led to the development and adoption of synthetic chemicals for managing crop pests and weeds. Indeed, plant protection products, such as synthetic pesticides and herbicides, helped maintain and increase agricultural yields for an extended period. However, chemical pesticides and herbicides have caused numerous adverse effects upon human health and the environment. So far, only a handful of biopesticides displaying more minor negative aspects are in commercial use. The project “BIOPESTCIDES” addresses a relevant issue for a more sustainable agroecosystems and aims to develop new biological control agents for the specific conditions in the Mediterranean region. It aims to reduce synthetic pesticides and herbicides to minimise potentially harmful effects on humans and the environment. The project is based on a transnational approach with partners from five countries, i.e., Germany (Central Europe), Greece (Southern Europe), Tunisia and Algeria (North Africa) and Turkey (Europe-Asia). This multinational collaboration combines complementary and synergistic research strengths, expertise, and equipment.

Objective and contents

The project’s primary goal is to identify, develop, and deliver alternative, economically, and ecologically sustainable biopesticides based on natural products from Mediterranean plants or microalgae, including cyanobacteria. The main goals of the proposed project are summarized as follows: a) Ethnobotanical survey and collection of plants with potential pesticidal effects from the Mediterranean region. Bioprospecting for microalgae with possible pesticidal activity. b) Evaluation of biological activities such as insecticidal, fungicidal, anti-bacterial and herbicidal effects under laboratory and field conditions. c) Formulation of different bioactive substances and selection of suitable adjuvants to enhance the effects. d) Analysis of bioactive substances using high-end analytics, including high-resolution mass spectrometry (HRMS) and nuclear magnetic resonance spectroscopy (NMR). e) Assess the toxicological impact of active plant/



Other Entities/ 8

Institute National de la Recherche Agronomique d'Algeria (INRA), Algeria
Scientific Officer: BOUCHIKH, Yamina

Technical University of Munich, Department of Chemistry, Germany
Scientific Officer: EISENREICH, Wolfgang

University Regensburg, Department of Cardiothoracic Surgery, Germany
Scientific Officer: BASIOUNI, Shereen

University M'Hamed Bougara of Boumerdes, Laboratory for Valorization and Conservation of Biological Resources, Algeria
Scientific Officer: ACHEUK, Fatma

University of Patras, Department of Environmental Engineering, Greece
Scientific Officer: TSIAMIS, George

Democritu University of Thrace, Greece
Scientific Officer: NTOUGIAS, Spyridon

Center of Biotechnology of Borj-Cedria, Laboratory of Molecular Physiology of Plants, Tunisia
Scientific Officer: LASRAM, Salma

Bursa Technical University, Turkey
Scientific Officer: YILMAZ, Mete

Ankara University, Turkey
Scientific Officer: EMEKÇI, Mevlüt

microalgal extracts, fractions, or purified compounds on beneficial insects, especially bees. f) Studying the mechanism of action, especially assignment of metabolic targets for the most promising candidates using novel labelling technology. g) Assessment of the safety of developed biopesticides on aquatic life (i.e., zebrafish embryos) and mammalian cell lines. h) Assessment of the socioeconomic impacts, as well as value chain mapping and analysis.

Expected impact and results

Collaboration between partners from academia and industry will create both scientific and commercial opportunities for exploitation. Within the project, customised methods for extractions, fermentations, analysis of bioactive substances and mechanism of action will be developed and made available to partners from academia and industry. This will establish new research networks that can be used for collaboration on a national and international level. The “BIOPESTICIDES” project will produce new knowledge, tangible products, and protocols fundamental for applying sustainable, health-safe, environmentally friendly biopesticides in the Mediterranean region. An expected outcome of the “BIOPESTICIDES” project is the development of natural products exhibiting a significant degree of specificity against harmful insects and weeds but which are safe for humans and environmental animals such as fish and beneficial insects. Application of natural herbicides and/or insecticides will reduce the chemical traces in the feed and food chain, reducing the negative impacts on humans and animals. By implementing this proposal, our research team’s long-term and key goal are to provide alternative, economically, and ecologically favourable biopesticides that may partially replace synthetic chemicals used so far. Additionally, the commercialization of plants or microalgae with herbicidal/insecticidal activities would generate income that will help sustain the livelihoods of communities in semi-arid areas.

Alternative sustainable biopesticides based on natural products from Mediterranean plants or microalgae

Thematic Area

Farming Systems

Section II

Topic - Re-design the agro-livelihood systems to ensure resilience

Action

RIA - Research & Innovation Action

Budget

1.061.944 €

Duration

36 months

State and Coordinator Entity

ITALY

Università degli Studi di Parma,
Dipartimento di Scienze degli Alimenti e del Farmaco

UNIVERSITÀ DI PARMA

Scientific Officer:
GALAVERNA, Gianni

Participating States/ 5

Research Units/ 7

Section II

8. CHANGE-UP

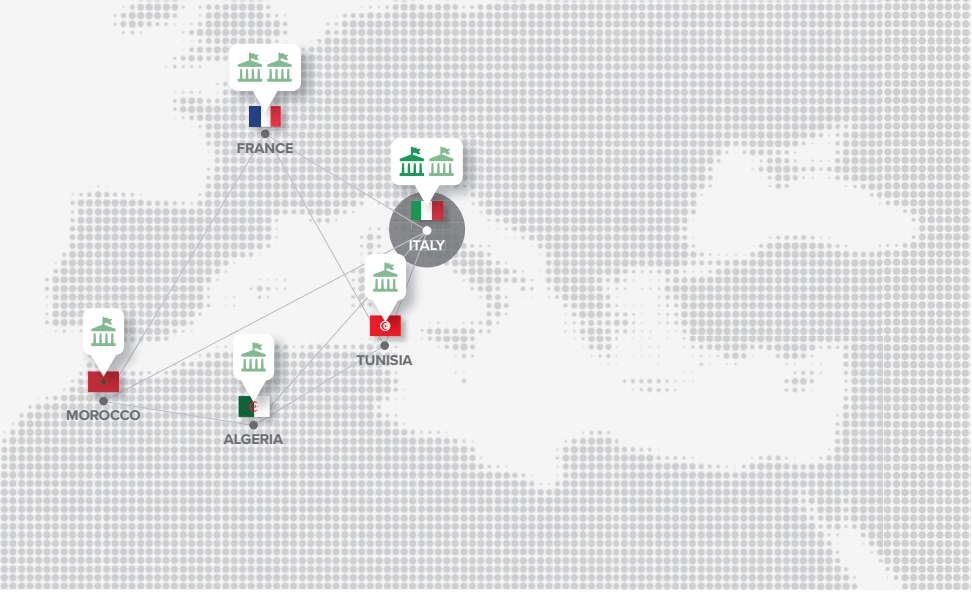
Innovative agroecological APProaches to achieving resilience to climate CHANGE in Mediterranean countries

Context

Cereals are the base for human nutrition and are cultivated mainly in all the Mediterranean area. Wheat is the most widely grown among cereals, with 61 M ha in Europe, 7.1 M ha in Northern Africa and about 8 M ha in Eastern Mediterranean countries (FAOSTAT 2018). In these areas, wheat plays a significant role in food security. Climate change has already resulted in unstable wheat production and increased vulnerability of the rural population. It is, therefore, crucial to enhancing cereal – and wheat mainly – production and resilience. Intensive agricultural systems based on optimizing the productivity of monocultures through large quantities of external inputs are widely criticized today for their negative environmental impacts, including soil erosion and degradation, chemical contamination, loss of biodiversity, and fossil fuel use. Conversely, highly diversified cropping systems based on ecological principles have been shown to have potential advantages in productivity, stability of outputs, resilience to disruption and environmental sustainability. However, they are sometimes considered harder to manage.

Objective and contents

CHANGE-UP will test solutions for an effective and environmentally sustainable type of agriculture able to mitigate climate change effects and promote the conservation of natural resources while ensuring farmers' economic stability and food security in the Mediterranean area.
The technological strategy is the integration of Evolutionary Populations of cereals (EPs – barley, common wheat, durum wheat, triticale) under crop rotation with a range of leguminous plants and New Perennial Grains (NPGs, perennial wheat lines).
Cereal EPs possess a high degree of within crop genetic diversity (heterogeneity), thus having a higher buffering capacity than homogeneous varieties to adapt to various abiotic and biotic stresses.
NPGs are new species obtained by hybridization and/or domestication holding great potential in facilitating soil physical-chemical properties, biodiversity and food web composition.



Other Entities/ 6

Consiglio per la Ricerca in Agricoltura e l'analisi dell'economia agraria (CREA), Centro di Ricerca Ingegneria e Trasformazioni Agroalimentari, Italy
Scientific Officer: GAZZA, Laura

Institute National de la Recherche Agronomique d'Algeria (INRA), Algeria
Scientific Officer:
BENBELKACEM, Abdelkader

French National Center for Scientific Research (CNRS), France
Scientific Officer: RUMPEL, Cornelia

French Agricultural Research Centre for International Development (CIRAD), France
Scientific Officer: FALLOT, Abigail

Université Abdelmalek Essaadi, Faculté polydisciplinaire de Larache, Morocco
Scientific Officer: EL FATEHI, Salama

Institut National de la Recherche Agronomique de Tunisia, Tunisia
Scientific Officer: ANNABI, Mohamed

NPGs and EPs embrace the agroecological principle of assuring optimized and stabilized yields by taking advantage of the synergies they can establish with the various elements of the environment such as soil properties, rainfalls and moisture level, biotic characteristics, thus reducing or nullifying the need for external inputs.

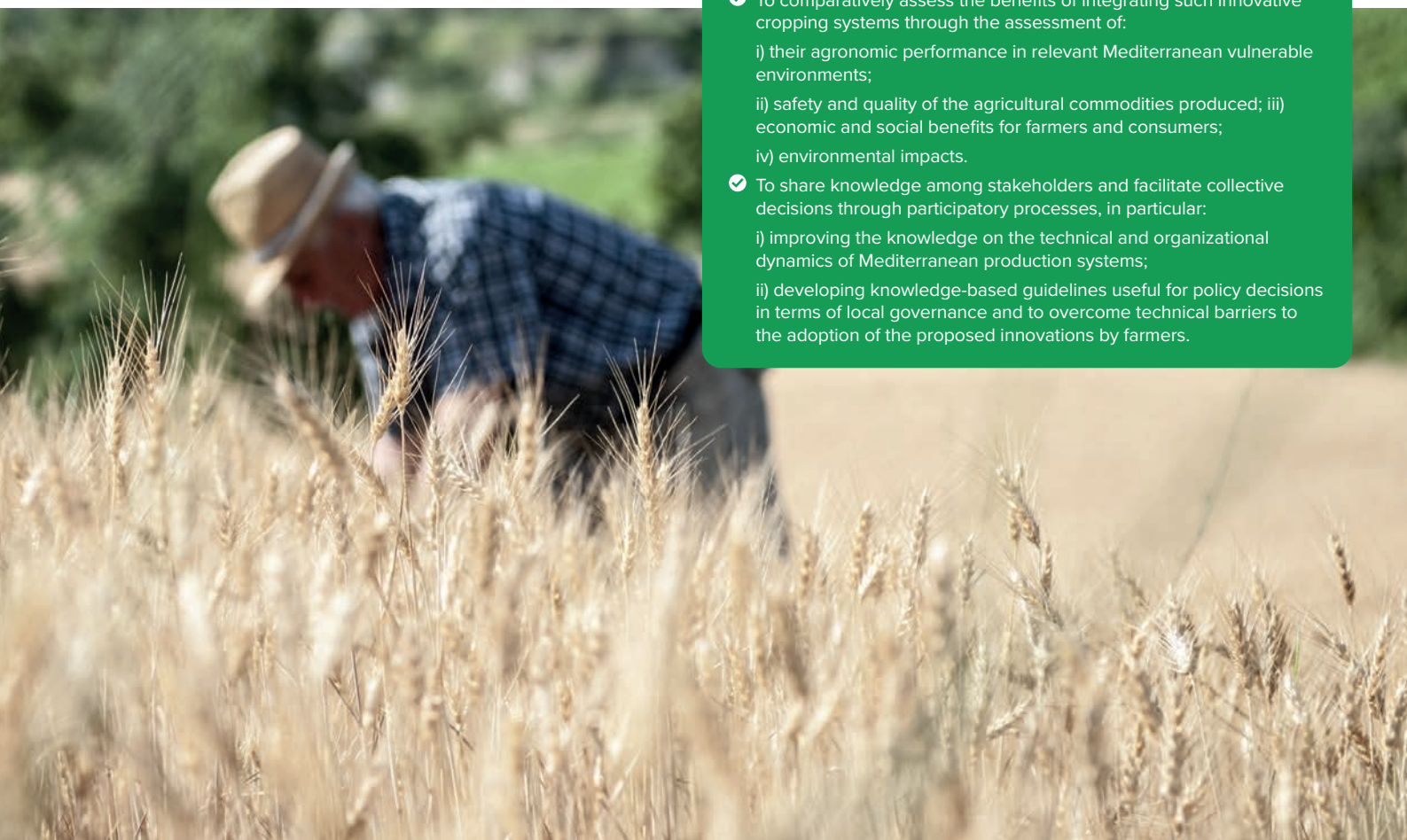
Expected impact and results

The project will assess and increase farming activity's economic and social sustainability by identifying drivers and gaps and taking actions for improvements focusing on local specificities and readiness of transferability. At least 200 farmers (with the target of 50% women farmers) will participate at different levels directly in the experimental work by either hosting the field trials or evaluating the field trials, workshops and T-groups, or by dissemination activities (field visits, events).
The project will quantify the farmers' mean increased incomes and satisfaction due to cereal yield stability and increase, together with the reduced use of agrochemicals (at least 50%) achieved thanks to rotation practices, crop diversification (legumes), EPs and NPGs adoption. Women and men farmers hosting the field trials will have the capacity and receive the necessary support, to access, maintain and increase their income from the use of Eps that increase production. At the same time, they retain yield stability and ecosystem resilience under changing climate conditions. Farmers will be left with seeds and practices to continue to use them well beyond the project duration. They will be testimonials for further extension of the approach during and after the project. Cereal EPs favour a more farmer centred seed and food production system where local farmers and small business enterprises engage in regional value chains to produce and sell high-quality foods.

Integration of Evolutionary Populations of cereals (EPs) under crop rotation with a range of leguminous plants and of New Perennial Grains (NPGs).

SPECIFIC OBJECTIVES

- To comparatively assess the benefits of integrating such innovative cropping systems through the assessment of:
  i) their agronomic performance in relevant Mediterranean vulnerable environments;
  ii) safety and quality of the agricultural commodities produced; iii) economic and social benefits for farmers and consumers;
  iv) environmental impacts.
- To share knowledge among stakeholders and facilitate collective decisions through participatory processes, in particular:
  i) improving the knowledge on the technical and organizational dynamics of Mediterranean production systems;
  ii) developing knowledge-based guidelines useful for policy decisions in terms of local governance and to overcome technical barriers to the adoption of the proposed innovations by farmers.



Thematic Area

Farming Systems

Section II

Topic - Re-design the agro-livelihood systems to ensure resilience

Action

RIA - Research & Innovation Action

Budget

1.455.721 €

Duration

36 months

State and Coordinator Entity

SPAIN

Consejo Superior de Investigaciones Científicas

CSIC
CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

Scientific Officer:
REVILLA, Pedro

Participating States/ 9

Research Units/ 11

Section II

9. DROMAMED

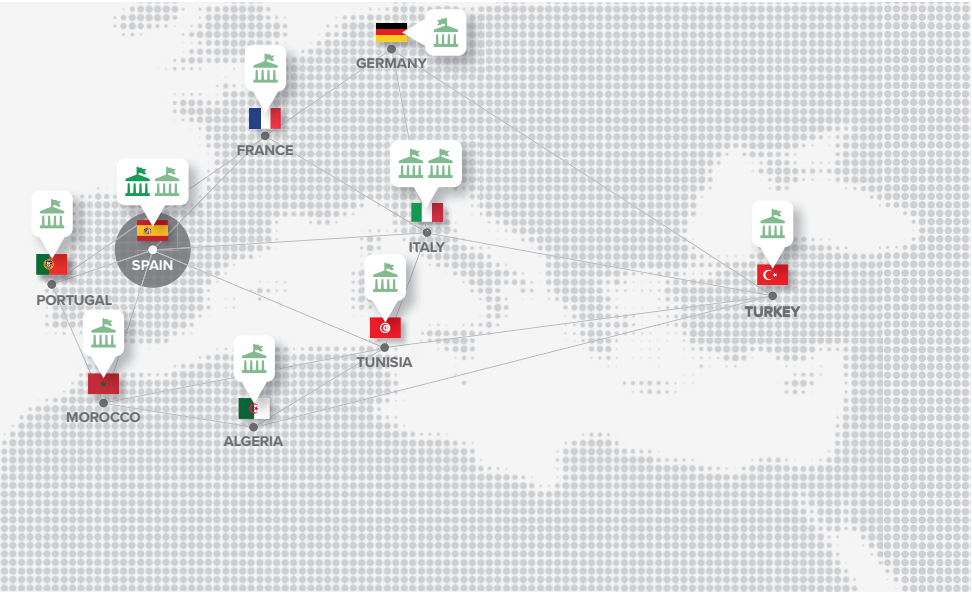
Capitalization of Mediterranean maize germplasm for improving stress tolerance

Context

The main problem of agriculture is drought, which is expected to worsen with climate change, particularly in the Mediterranean area. Maise has been chosen in this project because it is one of the most important crops worldwide and a model crop in plant breeding. Indeed, maise can constitute a model to demonstrate the usefulness of increasing crop diversity by introducing new tolerant genotypes and implementing sustainable agronomic practices to face global warming.
Mediterranean countries conserve the enormous maise genetic diversity of the Old World selected for adaptation to a wide variety of stressful environments. But only a low fraction of the available maise diversity is currently used in breeding programs. Therefore, capitalizing on those genetic resources of maise with tolerance to heat and drought stresses would be crucial to keep growing maise in areas with increasing water restrictions.

Objective and contents

This project aims to rescue maise germplasm adapted to arid Mediterranean areas to promote sustainable farming systems using agronomic practices that optimise inputs. Based on Mediterranean collections, we will advance the knowledge on the genetic, biochemical and physiological mechanisms underlying stress tolerance and provide valuable tools and materials to capitalize on the diversity of maise for adaptation to Mediterranean areas in a global warming scenario.
The project intends to: (i) develop innovative farming systems (IFS) by using germplasm collections maintained in Mediterranean countries, which hold large variability and have been selected for adaptation to a diversity of stressful environments; (ii) capitalize on current and new knowledge about mechanisms of adaptation to specific environments and tolerance to stresses to define novel selection indexes, and (iii) develop/improve IFS that will increase our ability to optimize breeding approaches and crop management practices enhancing maise adaptation and tolerance to abiotic stresses.



Other Entities/ 10

Universidade de Vigo, Spain
Scientific Officer: SANTIAGO, Rogelio

École Nationale Supérieure Agronomique, Algeria
Scientific Officer: DJEMEL, Abderahmane

Leibniz-Institute of Plant Genetics and Crop Plant Research, IPK Gatersleben, Germany
Scientific Officer: ALTMANN, Thomas

Génétique quantitative et Evolution - Le Moulon, France
Scientific Officer: CHARCOSSET, Alain

Università di Bologna, Dipartimento di Scienze e Tecnologie Agro-Alimentari, Italy
Scientific Officer:
FRASCAROLI, Elisabetta

Consiglio per la Ricerca in Agricoltura e l'Analisi del l'Economia Agraria (CREA), Centro di Ricerca Cerealicoltura e Colture Industriali, Italy
Scientific Officer: BALCONI, Carlotta

Institut National de la Recherche Agronomique (INRA), Morocco
Scientific Officer: SAHRI, Ali

Universidade Nova de Lisboa, Portugal
Scientific Officer:
VAZ PATTO, Maria Carlota

Institut National Agronomique de Tunisia (INAT), Tunisia
Scientific Officer: KARMOUS, Chahine

Bati Akdeniz Agricultural Research Institute, Turkey
Scientific Officer: ERDAL, Sekip

The specific objectives are to implement biodiversity-based IFS with resilient varieties adapted to each target area for enhancing the sustainability of farming systems understood as climate-resilient and efficient, cost-effective and environmentally and socially responsible.

Expected impact and results

The main social impact of this project is to promote transformations of current agricultural systems into new IFS for enhancing agro-food sustainability by carrying out climate-resilient and efficient, cost-effective and environmentally and socially responsible practices. This main impact should be achieved by the following expected specific results: 1) Redesign systems to minimize the risk of failure associated with yield losses due to inappropriate farming systems and climate change, and secure farmers' income; 2) Adoption of environmentally, socially and economically sustainable agroecosystems; 3) Facilitating learning and coordination among actors, between farmers and along the value chain; 4) Increased efficiency of the use of water resources; 5) Increased soil fertility by the proposed farming systems; 6) Increased income and satisfaction by the farmers, and 7) Yield stability and quality under challenging environmental conditions.

Genetic improvement of maize to climate change tolerance in Southern Europe and North Africa

SPECIFIC OBJECTIVES

- assemble germplasm collections of maize adapted to Mediterranean dry areas, pooling and evaluating stress-resistant varieties from the national collections;
- support innovative farming systems by promoting quality and sustainability of agricultural models based on organic and family agriculture;
- study genetic factors involved in maize adaptation to drought and heat stress;
- investigate the physiological and morphological mechanisms involved in maize responses to stresses;
- establish predictive models and selection criteria for breeding programs focusing on tolerance to stress (phenotypic, marker assisted and genomic selection models will be designed to improve tolerance to individual and combined stresses);
- release new stress tolerant varieties and knowledge for being used by stakeholders.

Thematic Area

Farming Systems

Section II

Topic - Re-design the agro-livelihood systems to ensure resilience

Action

RIA - Research & Innovation Action

Budget

779.816 €

Duration

36 months

State and Coordinator Entity

ITALY

Università degli Studi di Napoli Federico II, Dipartimento di Medicina Veterinaria e Produzioni Animali

UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II

Scientific Officer:
RINALDI, Laura

Participating States/ 7

Research Units/ 8

Section II

10. ECHINO-SAFE-MED

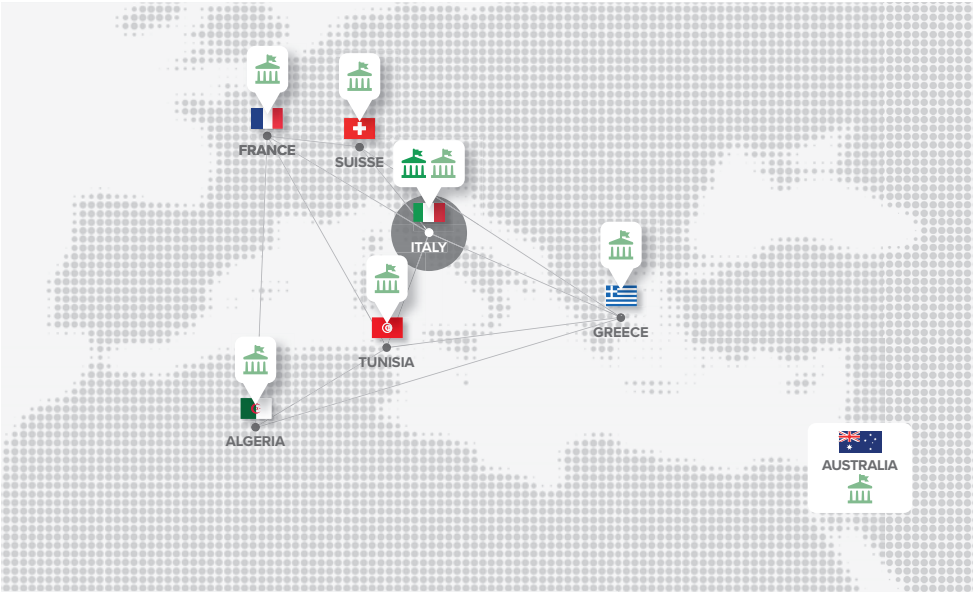
New sustainable tools and innovative actions to control cystic ECHINOcoccosis in sheep farms in the MEDiterranean area: improvement of diagnosis and SAFEty in response to climatic changes

Context

Small ruminant production systems are a significant component of the dairy and meat sector in the Mediterranean region and the only possible enterprises in less-favoured areas. Thus, it is fundamental to ensure sustainability and prevent diseases (e.g., parasitic diseases) affecting small ruminants' production, health, and welfare.
Cystic echinococcosis (CE) is one of the most important parasitic diseases of grazing sheep in the Mediterranean. CE is caused by the larval stages of the small tapeworm Echinococcus granulosus, a zoonotic Taeniidae of veterinary and public health importance. The life cycle of E. granulosus includes dogs and other canids as the definitive hosts of the adult parasite and livestock (mainly sheep) and humans as intermediate hosts. To date, the control and prevention of this disease are complicated due to the complex epidemiology of E. granulosus and the lack of suitable diagnostic tools and sustainable control strategies. Climatic changes (e.g., global warming) may influence the epidemiology of CE, due to their direct effect on the survival and the viability or infectivity of eggs released in the environment by the dog, and an indirect impact on sheep, through increased exposure to the parasite. Therefore, sustainable control strategies are needed to mitigate the adverse effects of the increasing spread of CE in these areas.

Objective and contents

The main aim of ECHINO-SAFE-MED is to implement the pasture-based livestock farming systems by delivering sustainable and cost-effective tools, as well as innovative strategies to control cystic echinococcosis (CE) in sheep farms with the final goal to improve health, welfare and productivity of small ruminant livestock sector in the Mediterranean regions. This will be obtained by using high throughput diagnostic, surveillance and control strategies to establish guidelines for sustainable CE control to be further extended to other endemic Mediterranean areas.
The project's objectives will be achieved by constructing an international network for sharing practices, methods, and data to promote efficient approaches to help animals and farming systems adapt to climate change in a concerted and organized way. Furthermore, a multi-level approach will be adopted. It involves local participating vets



Other Entities/ 7

Istituto Zooprofilattico Sperimentale del Lazio e della Toscana M. Aleandri, Italy
Scientific Officer: SARALLI, Giorgio

Ziane Achour University of Djelfa, Faculty of Nature and Life Sciences and Center Research in Agropastoralism, Algeria
Scientific Officer:
LAATAMNA, Abdelkarim

University of Melbourne, Australia
Scientific Officer:
LIGHTOWLERS, Marshall

Agence Nationale de Sécurité Sanitaire de l'Alimentation, de l'Environnement et du Travail (ANSES), France
Scientific Officer: BOUÉ, Franck

Hellenic Agricultural Organization-Demeter, Veterinary Research Institute, Greece
Scientific Officer: SOTIRAKI, Smaragda

University of Zurich, Institute of Parasitology, Suisse
Scientific Officer: DEPLAZES, Peter

Université de la Manouba, École nationale de médecine vétérinaire de Sidi Thabet, Tunisia
Scientific Officer: LAHMAR, Samia

and national sheep farmer's organizations to collect information on standard practices per country/region and assess the farmers' attitude towards sustainable helminth control and their potential adoption for novel diagnostics and novel concepts of CE control.

Expected impact and results

ECHINO-SAFE-MED will provide new solutions for improving agrosystem resilience to climatic change in the Mediterranean area, developing sustainable solutions to control CE to increase sheep productivity, thus improving the agro-livelihood, income and satisfaction by farmers in these areas. Furthermore, ECHINO-SAFE-MED will promote novel management practices based on sustainable and efficient use of natural resources (increasing sheep productivity) and decrease chemical inputs (e.g., vaccination of animals).
ECHINO-SAFE-MED improves control of CE in Mediterranean areas. It will render benefits at different levels: i) for farmers, redesigning the applied management systems against CE minimizing the risk of production losses due to inappropriate prevention/treatment systems and secure farmers' income protection in the same time public health; ii) to the scientific community, improving knowledge on CE, allowing the development of standardized tools and protocols; iii) to the authorities, supporting government/commission regulation agencies policy in CE, reporting and monitoring harmonization according to national legislation; iv) to the society, contributing to food safety by establishing consistent protocols for their ultimate application in monitoring and controlling CE, optimizing drug use. Finally, in perspective of the "One Health" concept, ECHINO-SAFE-MED activities will also impact CE on human health, reducing the burden of human disease in the Mediterranean area.

SPECIFIC OBJECTIVES

- to develop novel diagnostic tools for early detection of cystic echinococcosis in sheep in Mediterranean countries of Europe (i.e., France, Greece and Italy) and transfer these methodologies to Mediterranean areas in North Africa (i.e., Algeria and Tunisia);
- to improve surveillance and control activities for CE in Mediterranean areas through innovative sustainable strategies in highly endemic areas;
- to strengthen capacity for CE diagnosis, surveillance and control in both Africa and Europe through training & effective communication of project outcomes to project partners and relevant stakeholders, policymakers and end-users.

Thematic Area

Farming Systems

Section II

Topic - Re-design the agro-livelihood systems to ensure resilience

Action

RIA - Research & Innovation Action

Budget

580.182 €

Duration

36 months

State and Coordinator Entity

FRANCE

Université de Reims Champagne Ardenne, Groupe d'Etude des Géomatériaux et Environnements Naturels, Anthropiques et Archéologiques

Scientific Officer:
MORVAN, Xavier

Participating States/ 4

Research Units/ 8

Section II

11. ISFERALDA

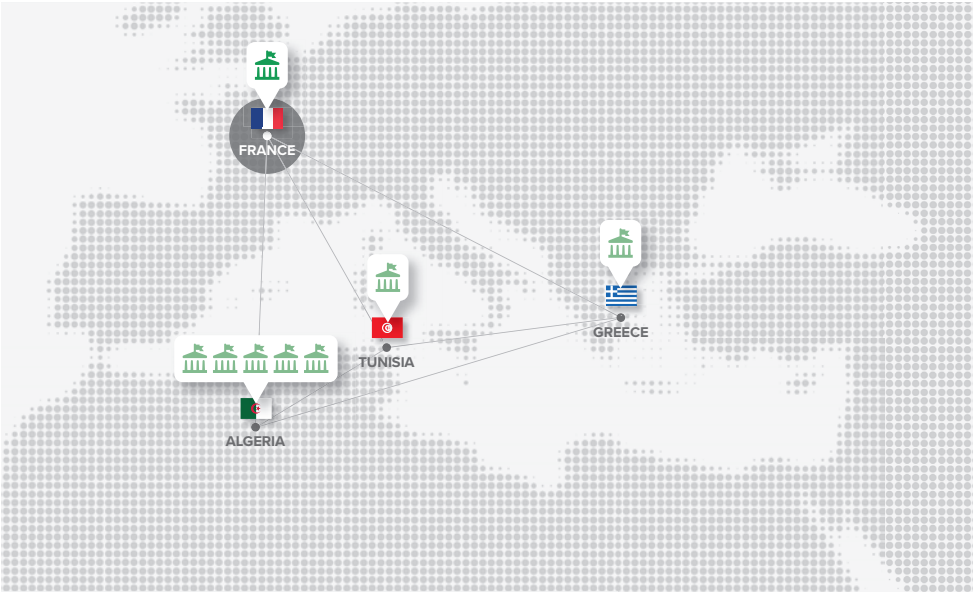
Improving Soil FERtility in Arid and semi-arid regions using Local DAte palm residues

Context

Oases are the primary driver of arid areas economy in the North African region. They have always played an essential role in developing dry areas as a source of employment and income for the population. They support a wide range of crops: dates at the highest level, fruit trees at a secondary level, vegetables, and other ground-level plants. In oases, farms are primarily small estates, rarely reaching a few hectares. Farming management of these small surface exploitations has to be highly productive to be profitable. Despite being traditionally intensive, it has always remained subsistence agriculture, inputs are weak, and mechanisation is very low. Furthermore, the ecosystems of these agrosystems are affected by numerous factors threatening their sustainability: e.g., the absence of surface water, soil, and groundwater salinisation. Date palm represents an essential product in the southern part of the Mediterranean. In Algeria, there are more than 19 million palm trees of all varieties. The cultivation of date palms generates a lot of agricultural wastes that are not recovered today. An Organic Amendment (OA) based on this abundant local resource would represent a durable solution widely adaptable to many countries. Its realisation would create local employment and develop the local economy.

Objective and contents

The project's primary goal is to increase the resilience of agroecosystems to climate change while ensuring comparable or higher incomes to local farmers by enhancing soil properties and soil fertility with an organic amendment produced mostly from date palm residues. Specific objectives have been defined based on interviews, identifying farmers' problems.
Date palm residues compost and biochar will be produced following conventional methods. This method is cheap and easy to use by local farmers. The different properties of OA will be measured in the laboratory to validate its quality before applying it to soils. The OA will be tested in the laboratory under controlled conditions to test different properties and mechanisms, and in the field, in agricultural plots of oases, which represent the operational environment.



Other Entities/ 7

University of Biskra "Mohamed Khider", Algeria
Scientific Officer: BOUMARAF, Belkacem

Institute National de la Recherche Agronomique d'Algeria (INRA), Algeria
Scientific Officer: HAFOUDA, Lamine

Technological Institute for the Development of the Saharan Agriculture, Algeria
Scientific Officer:
TIMECHBACHE, Mohamed Lakhdar

Université de Batna, Algeria
Scientific Officer: SBIH, Mathali

Palm Compost, Algeria
Scientific Officer: ZAAKIR, Abdennacer

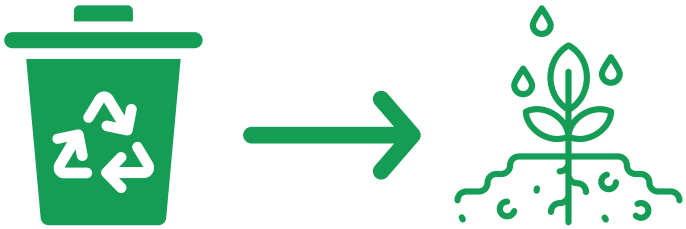
Hellenic Agricultural Organization - Demeter, Greece
Scientific Officer: KAVVADIAS, Victor

Institut des Régions Arides, Tunisia
Scientific Officer: MOUSSA, Mohamed

Expected impact and results

ISFERALDA project will help to adopt environmentally, socially, and economically sustainable agroecosystems productions. Amendments of crops with an organic amendment based on local date palm residues will help to improve soil properties and soil fertility. ISFERALDA aims to increase soil water retention and fertility by increasing soil organic carbon content and improving the soil's microbial and fungal life to help plants resist external aggressions.
Analysis of the results will allow the identification of the practices able to improve local actors' livelihoods and provide reliable information for designing public policies that will encourage the use or adoption of innovative and relevant cultural practices in the context of oases in an arid area.
Crop recommendation sheets will be written to help farmers choose the best and the most relevant farming systems with or without amendments. The applicable farming system will depend on the priorities of each farmer: increase of soil water retention capacity, improvement of soil fertility, use of less irrigation water volume.
The results of the ISFERALDA project can be considered an example for the future of the Saharan regions, where significant climate change may dramatically affect areas in which agriculture is vital.

Organic Amendment produced from local date palm residue



SPECIFIC OBJECTIVES

- Developing innovative Organic Amendment for crops in oases;
- Optimising the Organic Amendment management by measuring agronomic parameters and environmental impacts;
- Increasing competitiveness of Mediterranean agricultural products and profits via reducing external inputs and the increase of the yields;
- Disseminating the knowledge to the agricultural actors to upscale results from case studies to national scale across Mediterranean Basin.

Thematic Area

Farming Systems

Section II

Topic - Re-design the agro-livelihood systems to ensure resilience

Action

RIA - Research & Innovation Action

Budget

837.294 €

Duration

36 months

State and Coordinator Entity

SPAIN

Institut d'Estudis Regionals i Metropolitans de Barcelona

Scientific Officer:
MARULL, Joan

Participating States/ 5

Research Units/ 8

Section II

12. MA4SURE

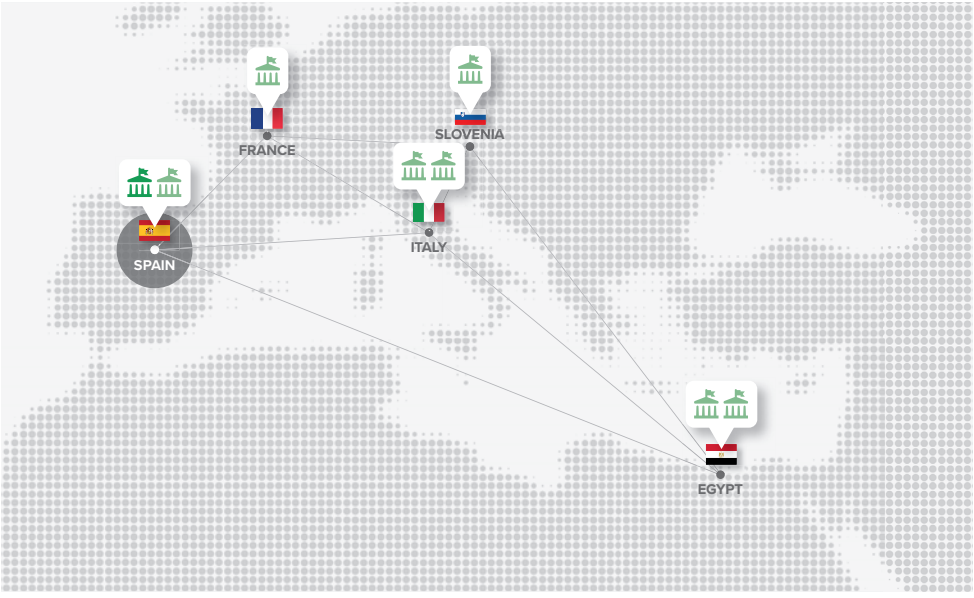
Mediterranean Agroecosystems for Sustainability and Resilience under Climate Change

Context

One of the leading social and environmental challenges of our world today is to improve food security for a growing population while preserving biodiversity and limiting the adverse effects on the environment that jeopardise the supporting, regulating, and cultural ecosystem services, especially under the impact of climate change. Agricultural systems in the Mediterranean region are characterised mainly by intensive monocultures, highly vulnerable to climate. These high-input systems are also characterised by an unsustainable use and management of natural resources dependent on external fertilisation at the expense of more sustainable and resilient crop systems, such as those represented by agroforestry and mixed farming systems. A transition towards more sustainable agri-food systems (i.e., an agroecological change) must be accompanied by comprehensive socio-ecological assessments and reliable and practical tools supporting farmers' and policymakers' decisions.

Objective and contents

The main aim of the MA4SURE project is to characterise sustainable and profitable agroforestry/mixed farming systems that are resilient and adaptive to climate change. It also aims to make efficient use of renewable resources, reduce greenhouse gas emissions, and explore the socio-economic and political conditions under which a shift to a more sustainable agroecosystem can be enabled.
MA4SURE project promote an inclusive socioeconomic approach to agroforestry (AF) mixed farming (MF) systems implementation to strengthen the capacity of farmers and policymakers to formulate longer-term strategies for restoring and improving agri-environmental measures based on MA4SURE results and recommendations.
In this sense, the MA4SURE project aims to provide rigorous analysis and produce valuable tools, such as a Decision Support System, that help improve the sustainability and resilience of agroforestry, mixed farming systems, and agricultural landscapes in the Mediterranean under climate change.



Other Entities/ 7

GRAMONA, Spain
Scientific Officer: GRAMONA, Jaume

Heliopolis University for Sustainable Development, Egypt
Scientific Officer:
YOUSRI HASHEM, Mohamed

Lotus for Organic Products, Egypt
Scientific Officer: ELDAHAN, Omar

Université Paris 1 Panthéon-Sorbone, France
Scientific Officer: GANA, Alia

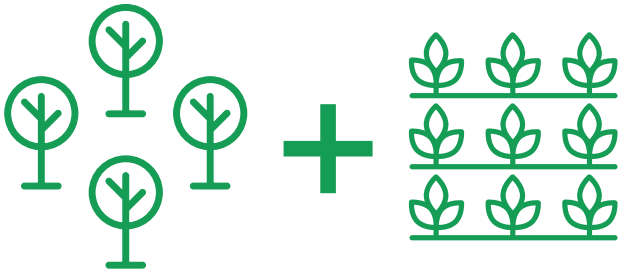
Università degli Studi di Firenze, Dipartimento di Scienze e Tecnologie Agrarie, Alimentari Ambientali e Forestali, Italy
Scientific Officer: PAFFETTI, Donatella

Terre Regionale Toscana, Italy
Scientific Officer: LOCATELLI, Marco

Slovenian Forestry Institute, Slovenia
Scientific Officer: KRAIGHER, Hojka

Expected impact and results

The primary outcomes of the MA4SURE will be to provide protocols for integrating trees with annual crops and animal production systems and crop rotation and field crop-tree associations suitable for different soil and climatic characteristics. This will help improve economically, socially, and ecologically agricultural systems in the Mediterranean. Additionally, the project will offer a set of indicators to feed a Decision Support System, evaluating the suitability of innovative agroecological practices in multiple site-specific conditions of the Mediterranean. Finally, the project will provide guidelines for common standards and policy recommendations at different scales (farm, landscape, regional) to ensure that the spread of agroforestry and mixed farming practices are socioeconomic inclusive, guarantee food security, and provide ecosystem services. The models and their feeding with empirical data from Mediterranean case studies will be developed following the EC Directorates, mainly the Farm to Fork Strategy as part of the EU Green Deal, the EEA, the FAO Climate-Biodiversity Department, and the IUFRO Task Force on Climate Change. The Decision Support System will follow the Agroecological Principles adopted by the HLPE FAO and Agroecology Europe, together with the steps of Agroecological Transition adopted by FAO and the European Commission.



Agroforestry/ Mixed Farming systems

SPECIFIC OBJECTIVES

- assess the viability and replicability of efficient and resilient AF/MF systems which are climate smart;
- examine scenarios capable of supporting crop and woody plant productivity while improving soil quality, value chains and green infrastructures as Ecosystem Services (ES) providers;
- deliver effective solutions for ensuring the highest level of performance and spread of AF/MF systems at farm and landscape scale under current and future Climate Change (CC) scenarios;
- provide and improve ES through integrated land and livestock managements that contribute to CC mitigation and adaptation;
- develop new synergies between agricultural production units to avoid wastes, lessen water overuse and pollution, and offsetting GHG emissions;
- promote a socioeconomic inclusive approach to AF/MF to ensure equal social and economic benefits;
- strengthen policy-makers capacity to formulate longer term policies for restoring and improving AE.

SOIL MANAGEMENT
benefits for quality and fertility

CROP ROTATION
combining woody perennials with forage and food crops

Thematic Area

Farming Systems

Section II

Topic - Re-design the agro-livelihood systems to ensure resilience

Action

RIA - Research & Innovation Action

Budget

807.874 €

Duration

36 months

State and Coordinator Entity

FRANCE

Université de Reims Champagne Ardenne, Laboratoire Résistance Induite et Bioprotection des Plantes

Scientific Officer:
AZIZ, Aziz

Participating States/ 6

Research Units/ 8

Section II

13. MiDiVine

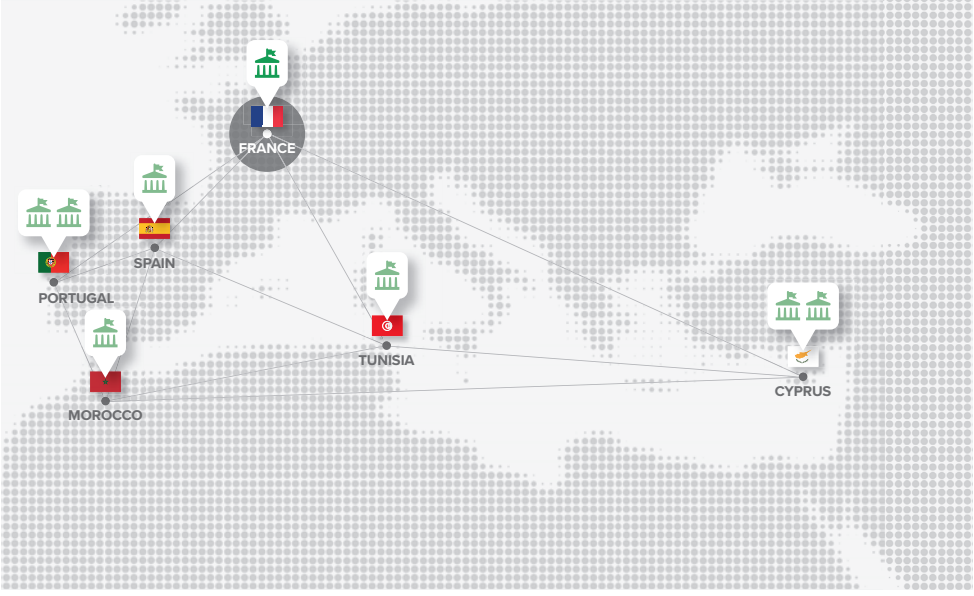
Innovative Approaches Promoting Functional Microbial Diversity for a Sustainable Grapevine Health and Productivity in Vineyard Systems of Mediterranean Areas

Context

Mediterranean countries are among the biggest grape producers. Still, the current changes in climatic conditions, including recurrent droughts, have become a massive threat to the sustainability of grape production, food security and farmers' incomes in this region. These climatic changes will also affect plant diseases, altering more fruit yield and quality and processing. The majority of the grown grapevine cultivars (Vitis vinifera L.) are susceptible to fungal infections requiring chemical pesticides that are harmful to human health and the environment. These negative impacts have sparked increasing interest in developing safer innovative strategies while maintaining or even growing agricultural production levels, the quality of harvesting products, and the economic profitability of farms and agricultural value chains. Success will necessarily involve combinations and integrations of many levers, ranging from varietal selection to farming practices and systems changes. The farming system's most promising and innovative levers use and manage functional microbial diversity with beneficial viticultural practices. Manipulation of plant microbiome has great potential in reducing disease incidences, promoting plant growth and fitness and increasing productivity even under stress conditions.

Objective and contents

MiDiVine aims to develop knowledge, tools, and integrated approaches based on grapevine genetic resources and agricultural practices promoting functional microbial diversity (FMD) to improve grapevine production and resistance against the central foliar and trunk diseases (grey mould, downy mildew and esca) under drought stress conditions. The project will focus on the characterization of FMD and identifying beneficial microbes from traditional cultivated/elite with different practices and indigenous vines for improving grapevine health and productivity in open vineyards under water shortage conditions. MiDiVine project will analyze the impact of plant genotype, soil type and agricultural practices, including covers and service plants, on FMD and beneficial microbes against diseases under stress conditions. In addition, the environmental footprint for each of the proposed practices will be determined (e.g., C sequestration due to cover crops and reduced tillage).



Other Entities/ 7

Cyprus University of Technology, Cyprus
Scientific Officer: TZORTZAKIS, Nikolaos

Sustainability Metrics, Cyprus
Scientific Officer: LITSKAS, Vassilios

Institute of Grapevine and Wine Science-La Rioja Government (ICVV), Spain
Scientific Officer: POU, Alicia

Institut National de la Recherche Agronomique, Centre Régional de la Recherche Agronomique de Meknès, Morocco
Scientific Officer: ACHBANI, ElHassan

FCiências.ID - Associação para a Investigação e Desenvolvimento de Ciências, Portugal
Scientific Officer:
FORTES, Ana Margarida

SOGRAPE VINHOS SA, Portugal
Scientific Officer: GRAÇA, António

Institut National de la Recherche Agronomique de Tunisia (INRAT), Tunisia
Scientific Officer: HARBI, Mounira

Therefore, the proposal will provide an innovative and sustainable solution to improve agroecosystem services by managing soil microbiome and intercropping in Mediterranean countries to reduce dependency on agrochemical pesticides in vineyards.

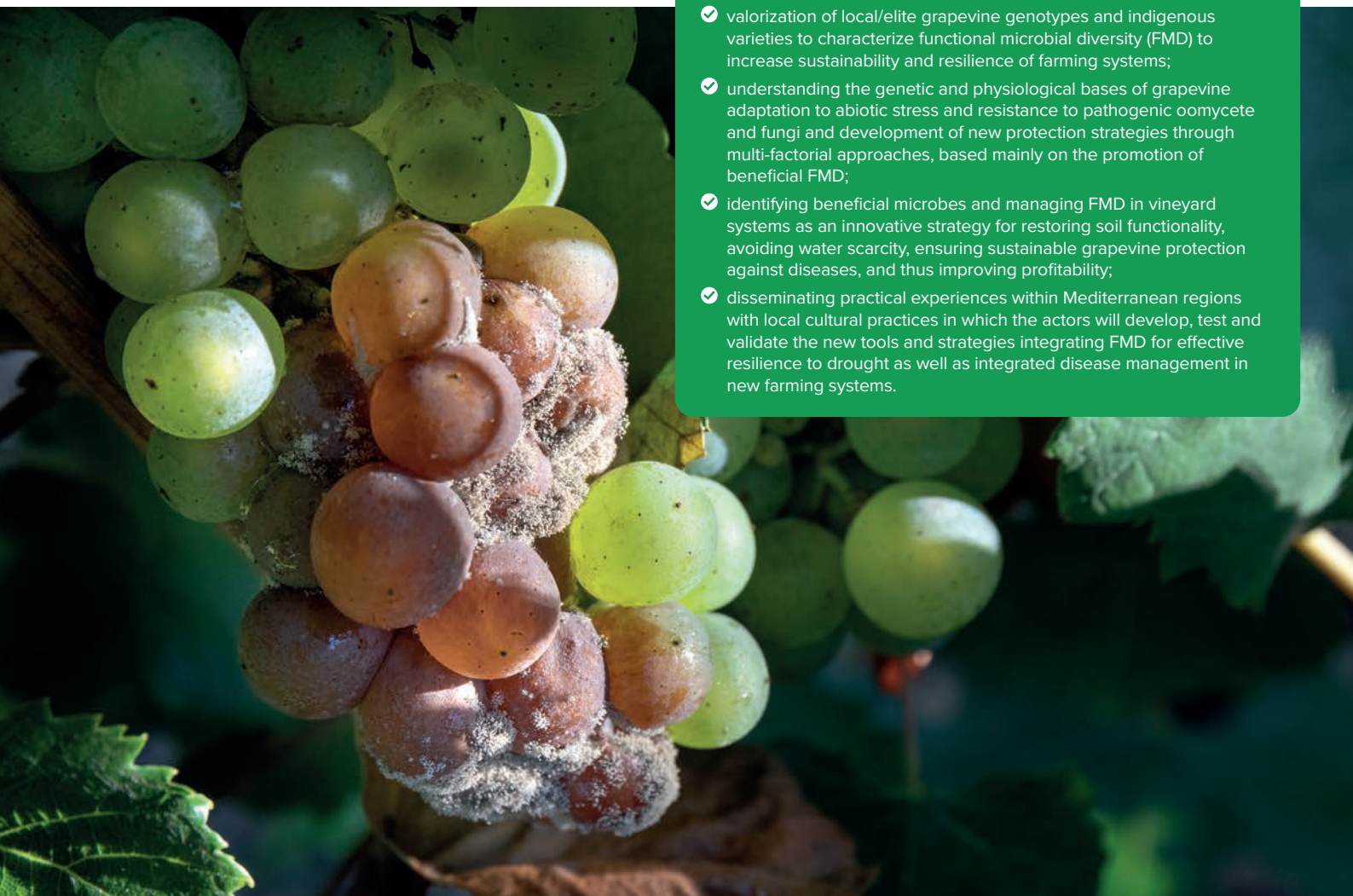
Expected impact and results

MiDiVine project will provide advanced knowledge by improving biodiversity in vineyards, reducing inputs and environmental impacts whilst increasing environmental quality in agrosystem, grapevine resilience to climate change and diseases in a sustainable way and considering regional specificities. By combining selection process, genomics approaches, microbial diversity, agronomic practices with specific covers and service plants, precision viticulture tools, physio-molecular analysis, biocontrol strategy and disease management, MiDiVine expects to generate the following impacts:

- Improving research and innovation potential within Mediterranean regions and worldwide;
- Understanding the genetic, physiological and molecular bases of grapevine adaptation to abiotic stress and resistance to fungal diseases and develop new protection strategies through multi-factorial approaches, based mainly on the use and management of functional microbial biodiversity;
- Integrating functional microbial biodiversity into technical itineraries of farming systems of different geographical locations involved in grape production in Mediterranean countries;
- Achieving an economically and environmentally sustainable agroecosystem combines optimal use efficiency of natural resources, lower inputs, and increased biodiversity and production stability that collectively sustain crop resilience and profitability;
- Improving product quality, food security, transition to a biobased economy, knowledge to support the decision-making process and increase competitiveness through innovations.

SPECIFIC OBJECTIVES

- valorization of local/elite grapevine genotypes and indigenous varieties to characterize functional microbial diversity (FMD) to increase sustainability and resilience of farming systems;
- understanding the genetic and physiological bases of grapevine adaptation to abiotic stress and resistance to pathogenic oomycete and fungi and development of new protection strategies through multi-factorial approaches, based mainly on the promotion of beneficial FMD;
- identifying beneficial microbes and managing FMD in vineyard systems as an innovative strategy for restoring soil functionality, avoiding water scarcity, ensuring sustainable grapevine protection against diseases, and thus improving profitability;
- disseminating practical experiences within Mediterranean regions with local cultural practices in which the actors will develop, test and validate the new tools and strategies integrating FMD for effective resilience to drought as well as integrated disease management in new farming systems.



Thematic Area

Farming Systems

Section II

Topic - Re-design the agro-livelihood systems to ensure resilience

Action

RIA - Research & Innovation Action

Budget

815.489 €

Duration

36 months

State and Coordinator Entity

SPAIN

Universitat Jaume I

Scientific Officer:
ARBONA, Vicente

Participating States/ 6

Research Units/ 9

Section II

14. OPTIMUS PRIME

Optimal usage of natural product and biological priming agents to improve resilience of agrosystems to climate change

Context

The Mediterranean area is particularly prone to adverse abiotic and biotic conditions derived from climate change. OPTIMUS PRIME pursues the design of innovative farming strategies based on the use of natural compounds and microorganisms as seed priming treatments to improve the resilience of widespread commercial varieties and locally adapted landraces of tomato (Solanum Lycopersicum L. Mill) to the combination of water deficit, high temperatures and the incidence of two important tomato pests: tomato pinworm Tuta absoluta and the invasive spider mite Tetranychus evans. In Mediterranean agriculture, an unsustainable model is predominant in high-density plantations supported by on-demand irrigation and chemical control of pests. Climate change poses an extra challenge for the sustainability of current agricultural systems in the Mediterranean area by increasing the chances of damaging heat waves, reducing water availability, affecting soil microbiota composition, and favouring alien pest invasion, subsequently putting farmers' income and welfare at risk.

Objective and contents

OPTIMUS PRIME proposal focuses on natural products and beneficial soil microorganisms such as arbuscular mycorrhizal fungi (AMF) and plant growth promoting rhizobacteria (PGPB) as seed priming agents to improve resilience of commercial widespread tomato genotypes and local adapted landraces to challenging environments including invasive pest attack.
Priming modulates plant physiology and biochemistry, increasing the ability of the primed plants to endure the stress conditions and thrive. Priming is achieved by exposing plants or plant tissues to different compounds and/or microorganisms. In this respect, seed priming has been shown to induce tolerance to stress conditions in plants. No additional workforce and other resources are required to carry out field treatments, constituting a cost-effective practice to generate climate-ready crops.
OPTIMUS PRIME aims to design, optimize and deliver a cost-efficient seed priming technology based on the combination of natural compounds and microorganisms to improve crop performance and productivity under adverse environmental conditions contributing to a sustainable agriculture.

Other Entities/ 8

Cyprus University of Technology, Cyprus
Scientific Officer:
FOTOPOULOS, Vasileios

Novacert, Greece
Scientific Officer:
EVAGELOPOULUS, Ioannis

Consiglio Nazionale delle RIcerche (CNR), Istituto per la Protezione Sostenibile delle Piante, Italy
Scientific Officer: BALESTRINI, Raffaella

Agenzia Lucana di Sviluppo e di InnovAction in Agricoltura, Italy
Scientific Officer: CELLINI, Francesco

La Semiorto Sementi srl, Italy
Scientific Officer:
FORMISANO, Gelsomina

Ecole Nationale d'Agriculture de Meknès, Morocco
Scientific Officer: AMIRI, Said

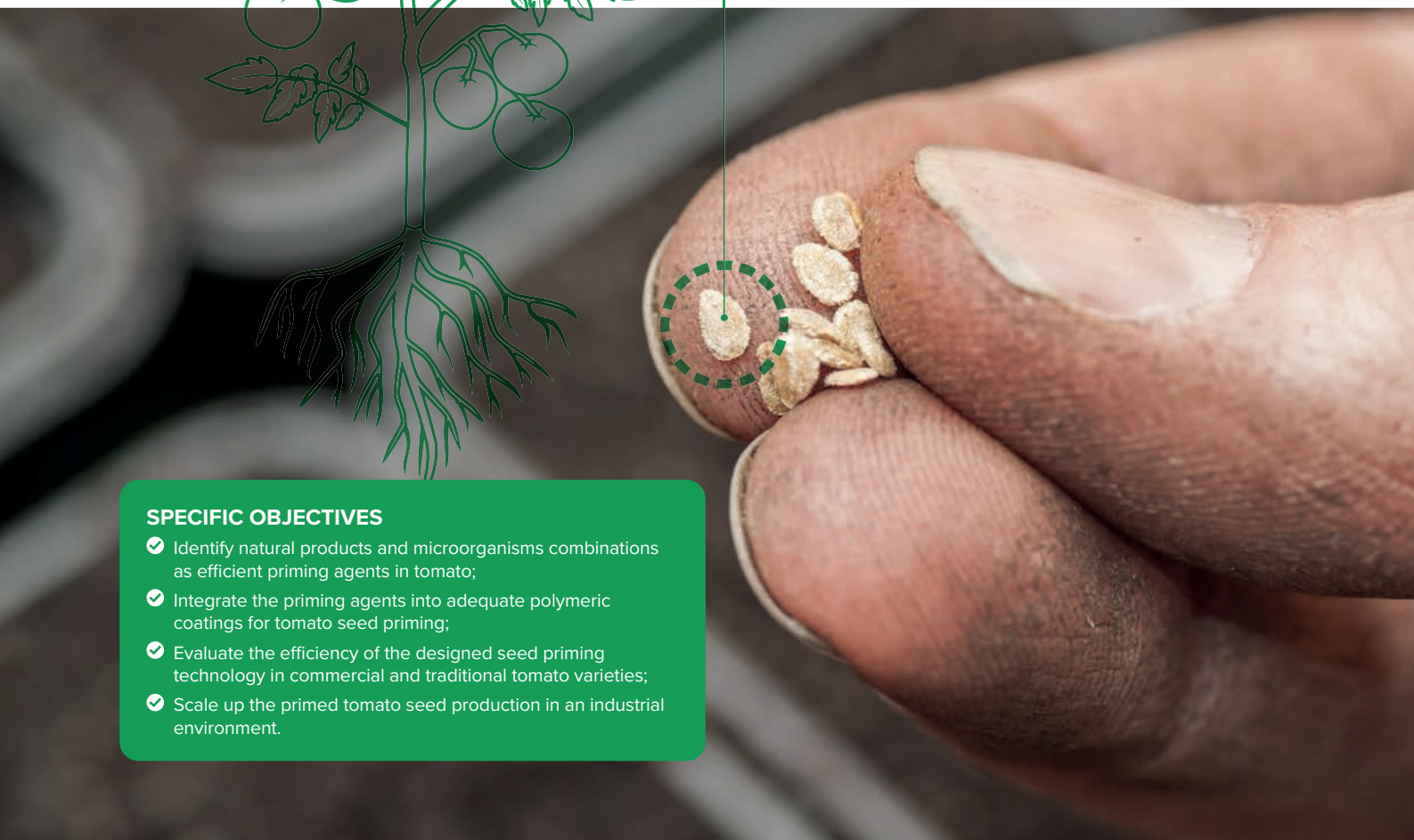
Université Hassan II de Casablanca, Faculté des Sciences et Techniques de Mohamedia, Morocco
Scientific Officer: HMYENE, Abdelaziz

Ege University, Turkey
Scientific Officer: TURKAN, Ismail

Expected impact and results

OPTIMUS PRIME will render benefits at different levels: i) technological, through the identification of priming treatments to generate climate-ready plants with enhanced defence mechanisms against abiotic threats and pests ii) scientific, the characterisation of target genes, molecules and pathways and their involvement in the priming process, iii) ecological, reduction in synthetic chemical inputs and improvement in the usage of water and other natural resources, facilitating the transition from conventional to organic farming and iv) socioeconomic, providing a cost-efficient technology to maintain farmers' income and ensure their welfare through the valorisation of tomato varieties highly adapted to each respective local edaphoclimatic conditions, maintaining their production and quality traits at no additional ecological cost and even reducing the application of expensive and ecotoxic pesticides to manage essential pests such as Tuta absoluta and Tetranychus evansi.
In this respect, OPTIMUS PRIME goes beyond the state-of-the-art in priming for stress tolerance research targeting seeds by applying combinations of natural compounds and microorganisms, with an already proven effectiveness in stress protection.
Primed seeds' production and commercialization constitute a crucial technological breakthrough in agriculture and a novelty in line with current real-world agricultural needs.

use of bioresources as tomato seed priming treatments



SPECIFIC OBJECTIVES

- Identify natural products and microorganisms combinations as efficient priming agents in tomato;
- Integrate the priming agents into adequate polymeric coatings for tomato seed priming;
- Evaluate the efficiency of the designed seed priming technology in commercial and traditional tomato varieties;
- Scale up the primed tomato seed production in an industrial environment.

Thematic Area

Farming Systems

Section II

Topic - Re-design the agro-livelihood systems to ensure resilience

Action

RIA - Research & Innovation Action

Budget

1.050.608 €

Duration

48 months

State and Coordinator Entity

ITALY

Università degli Studi di Padova, Dipartimento di Biologia

Scientific Officer:
ZOTTINI, Michela

Participating States/ 4

Research Units/ 6

Section II

15. PROSIT

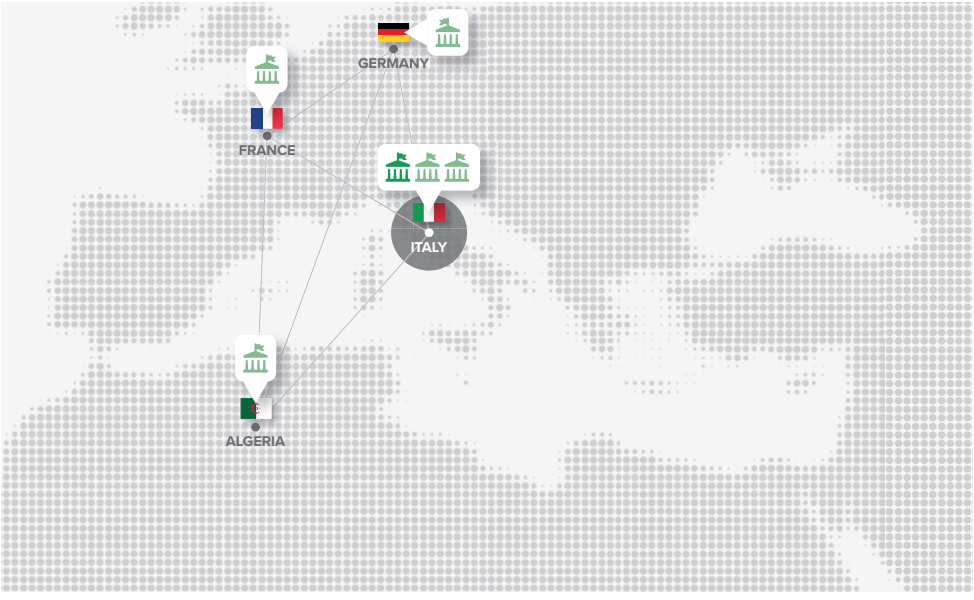
Plant microbiomes in sustainable viticulture

Context

The grapevine industry is an economically important sector for several Mediterranean countries, and the pressure of growing market demand has accelerated the whole production process. The intensification of grapevine cultivation is causing a progressive simplification of the agroecosystems associated with a progressive loss of biodiversity with possible negative consequences on the functions and ecosystem services. In this context, it is necessary to define management protocols that promote sustainability by supporting the maintenance and improvement of biodiversity within the vineyard agroecosystem. In the field, plants are continuously exposed to severe abiotic stresses often associated with extreme weather events that have been more frequent in the last decades because of the global climate changes. Recently, different groups highlighted the emerging role of endophytic microbes in agriculture to enhance/improve nutrient uptake and resistance to abiotic and biotic stresses. The use of microbial endophytes as biological control agents encompasses several advantages. These microbial inoculants are environmentally safe, show a more negligible risk for human and animal health and the environment, and allow a reduction of agrochemical inputs. Also, and importantly, beneficial microbial endophytes are effective for a targeted activity for plant diseases and stress control, thus allowing a reduced development of pathogen resistance and preserving the balance between microbial ecosystems.

Objective and contents

The overall goal of PROSIT is to characterise and harness the plant-associated microbial biodiversity in making typical Mediterranean agroecosystems more resilient to climate change. A transdisciplinary approach that encompasses physiological, metagenomic, transcriptomic, metabolomics, and epigenomics will be developed. It aims at unravelling the microbiome-driven molecular pathways associated with plant drought resilience, taking the Grapevine case study, a significant crop in all Mediterranean Countries. This aims at testing the efficiency of natural microbiomes on drought tolerance. PROSIT will also determine the efficiency of natural microbiomes transferred from Grapevine adapted to arid climate on drought tolerance to commonly cultivated



Other Entities/ 5

Consiglio Nazionale delle Ricerche (CNR), Istituto di Bioscienze e Biorisorse, Italy
Scientific Officer: PACIFICO, Davide

Università degli Studi di Milano, Dipartimento di Bioscienze, Italy
Scientific Officer: COSTA, Alex

Ecole Nationale Supérieure Agronomique, Algeria
Scientific Officer: LEHAD, Arezki

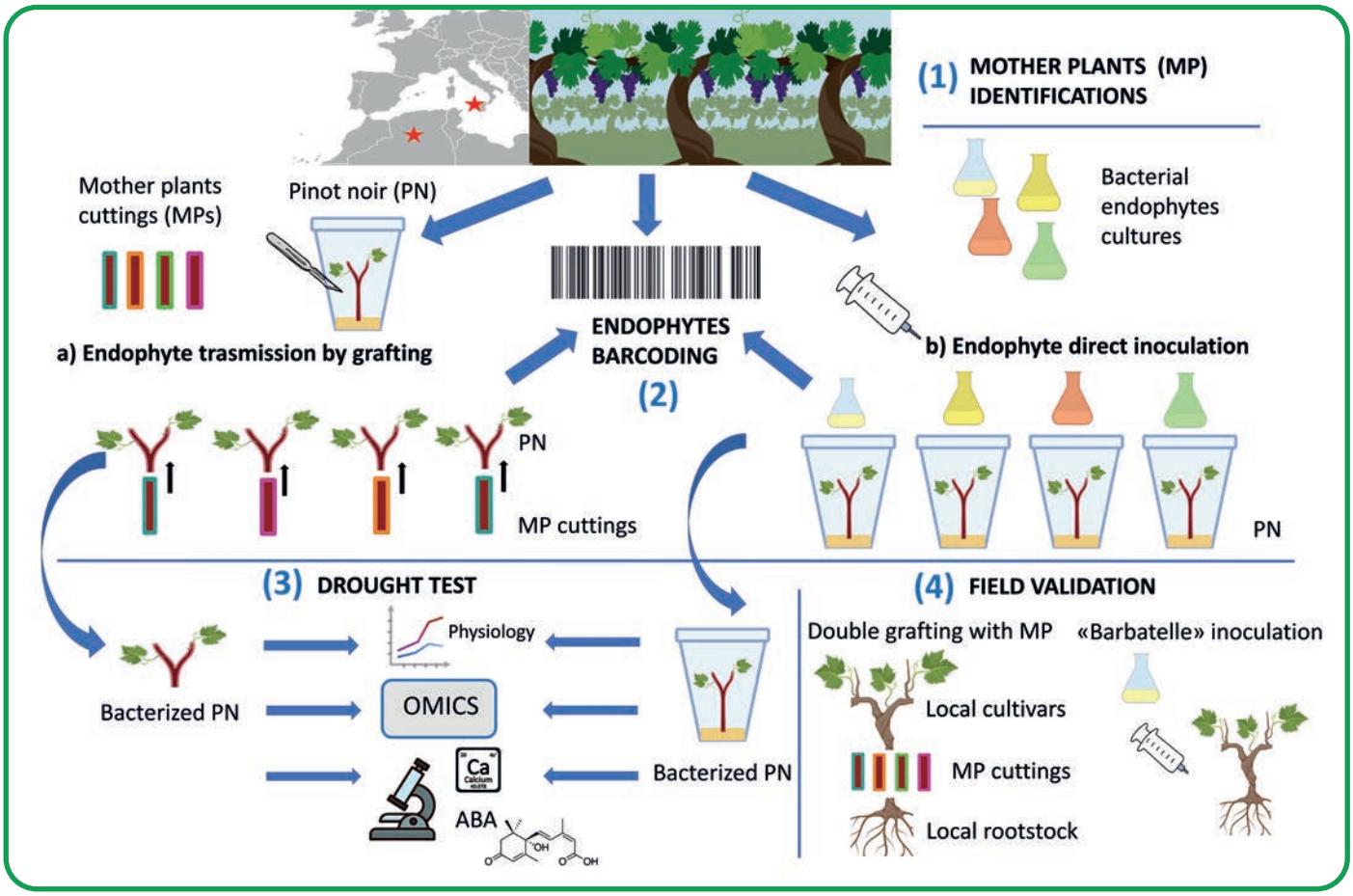
Max-Planck Institute for Molecular Plant Physiology, Germany
Scientific Officer: FERNIE, Alisdair

Ecophysiologie et Génomique Fonctionnelle de la Vigne, France
Scientific Officer: GALLUSCI, Philippe

grapevine cultivars. This will be achieved using two different strategies: stem grafting and direct inoculation. Upon its completion, PROSIT will deliver innovative and cost-effective tools and innovative farming systems to help maintain grapevine productivity in a drier Mediterranean climate and expand its cultivation to semi-arid areas.

Expected impact and results

PROSIT will unravel the microbiome-grapevine association's role in the plant's response to drought stress and harness the potential of natural biodiversity of microbiome arisen in regions with different climatic conditions to define microbe consortia to be used in sustainable viticultural practices in the future adverse environmental conditions. More closely, our research aims to understand to which extent different Vitis vinifera varieties adaptation to water deficit is influenced by the microbiome and whether such a beneficial microbiome is transmissible to other varieties.
PROSIT will bring direct benefits in reducing the workload associated with irrigation operations, reducing costs for the construction and maintenance of water supply and distribution systems, and replacing senescent plants due to the impact of water stress. In addition, PROSIT outcomes will allow wine producers to valorise their products, responding to the requests of consumers who are increasingly sensitive not only to the quality of the wine but also to managing environmentally-friendly vineyards. The transition to more sustainable and resilient farming systems will be investigated. Implementing an endophyte will open a new vision for agriculture to optimise natural resources' benefits and set up an agrobiological system by optimising natural resources available on site. The use of endophytes for stress management is a new way to optimise grapevine capacity to struggle with drought, pests, and diseases.



Thematic Area

Farming Systems

Section II

Topic - Low cost, lean solutions for enhancing irrigation efficiency of small-scale farms

Action

RIA - Research & Innovation Action

Budget

1.066.375 €

Duration

36 months

State and Coordinator Entity

ITALY

Università del Piemonte Orientale Amedeo Avogadro

Dipartimento di Scienze e InnovAction Tecnologica

Scientific Officer:
LINGUA, Guido

Participating States/ 5

Research Units/ 12

Section II

16. ProSmallAgriMed

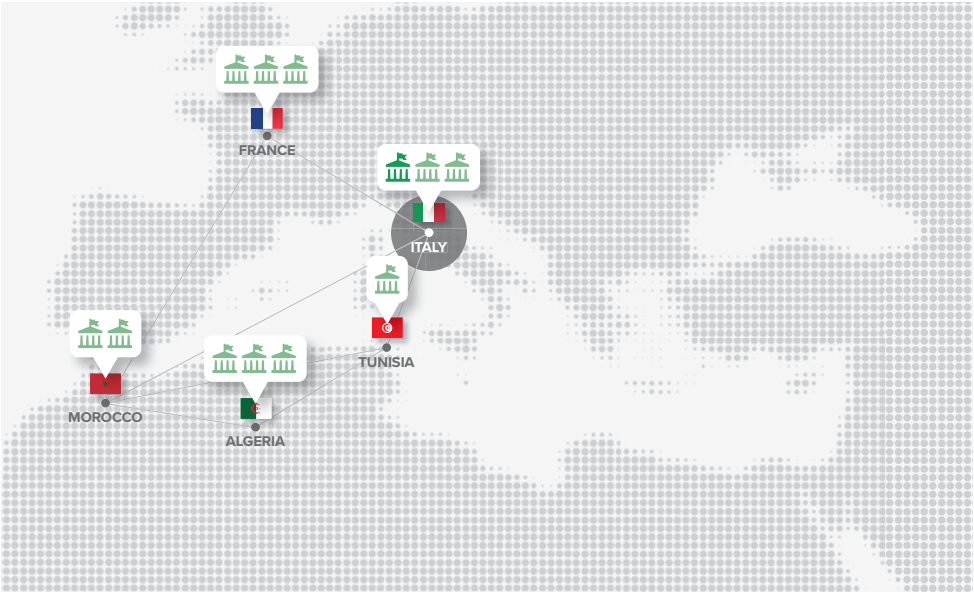
Promoting soil fertility, yield and income in smallholder agriculture of semiarid and arid Mediterranean regions by management of beneficial soil microbiota, conservationagriculture and intercropping

Context

Several large regions of the Mediterranean area are characterized by arid or semiarid climates. In this context, agronomic practice is hampered by low water availability and reduced soil fertility. Therefore, yield can be poor and highly variable in time. In addition, productivity is exposed to climate change-related risks.
Conservation agriculture can help improve the soil features in the short and long term, especially relying on species that can grow and produce even in the difficult conditions mentioned above. Cactus pear is incredibly resilient in arid and semiarid climates because of its extraordinary efficiency in water use and ability to tolerate aridity.
Under field conditions, plants interact with several beneficial microorganisms, like arbuscular mycorrhizal fungi and plant growth-promoting bacteria. Such interactions have repeatedly been related to improved plant growth, health, productivity, and ability to tolerate biotic and abiotic stress.
The use of intercropping (the cultivation of two or more species simultaneously) can increase the complexity and resilience of agroecosystems, improving their economic, agronomic, and ecologic traits. Intercropping, associated with beneficial soil microbiota, increases the plant and microbial diversity of the agroecosystems. This is especially effective when the system involves perennial species that are drought-tolerant, like a cactus pear. In addition, arbuscular mycorrhizal fungi connect, by means of the "common mycorrhizal networks", the roots of different plants in the same area, with positive effects on the plant yield and the preservation of the hyphal networks.

Objective and contents

The project ProSmallAgriMed aims to promote the rational use of beneficial soil microbiota and improve small farmer agronomic practices to enhance the productivity of inter-cropped perennial (cactus pear) and short-term species (field crops and vegetables) and promote synergistic cooperation between farmers and the value chain. The optimization of such practices in water-limited environments will contribute to food security by (1) enhancing carbon sequestration and ensuring soil fertility; (2) expanding land coverage in space and time, thus supporting soil conservation and water use efficiency; (3) improving yields for consumption as food, feed, or industrial transfor-



Other Entities/ 11

Università degli Studi di Palermo, Dipartimento di Scienze Agrarie, Alimentari e Forestali, Italy
Scientific Officer: LIGUORI, Giorgia

Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria (CREA), Centro di ricerca per la cerealicoltura e le colture industriali, Italy
Scientific Officer: SAIA, Sergio

Université Badji-Mokhtar Annaba, Algeria
Scientific Officer: MEDDAD, Amel

ANVREDET Agence Nationale de Valorisation des Résultats de la Recherche et du Développement Technologique, Algeria
Scientific Officer: MESSAOUDI, Hicham

TCHIMBO, Algeria
Scientific Officer: HAMDAOUI, Morgiane

QualiSud, Démarche intégrée pour l'obtention d'aliments de qualité, France
Scientific Officer: ACHIR, Nawel

MOISA Marchés, Organisations, Institutions et Stratégies d'Acteurs, France
Scientific Officer: FORT, Fatiha

Qualiplante SAS, France
Scientific Officer: CHATILLON, Caroline

Université Sidi Mohamed Ben Abdellah, Morocco
Scientific Officer:
EL GHACHTOULI, Naïma

Cactus Premium Sarl, Morocco
Scientific Officer: AIT HAMOU, Abderrahmane

Institut National Agronomique de Tunisia (INAT), Tunisia
Scientific Officer: LABIDI, Sonia

mation; (4) increasing the nutritional quality of crop products; and (5) guaranteeing water and soil quality by decreasing chemical inputs. Such goals will be pursued by stimulating smallholder associations by increasing their expert knowledge and ability to interact each other and with various actors of the value chain, and by modulating new agronomic practices to be tested in real-life field conditions. The technological transfer to Maghreb farmers of know-how in the improvement of water efficiency and use of targeted beneficial soil microbial inocula will give farmers a competitive advantage in the production of high-quality products and promote the establishment of start-ups specialized in the production of targeted inocula, based on indigenous beneficial soil microbes.

Expected impact and results

The outcomes of the project will be instrumental in increasing the food and by-product production per unit area and time, and in upgrading (i) the ecological and agro-ecological conditions of semiarid and arid areas through a rationalization of the use of chemical inputs, a reduction of soil erosion and water loss, and increased resilience to climate change; (ii) the social and economic conditions of farmers; (iii) the social and economic conditions of the countries hosting new enterprises; and (iv) the ability of local smallholder farmers to exploit important agronomic information from similar areas and adapt it and apply it to their areas.

Agronomic practices to enhance the productivity of inter-cropped perennial (cactus pear) and short-term species (field crops and vegetables)

SPECIFIC OBJECTIVES

- Promoting the use of beneficial soil microorganisms;
- improving the agronomic practice of smallholder farmers to increase the yield of intercrops, represented by a perennial species (cactus pear) and short-term species (field crops and winter-grown vegetables);
- Promoting synergistic cooperation between farmers and the food-value chain.

Thematic Area

Farming Systems

Section II

Topic - Re-design the agro-livelihood systems to ensure resilience

Action

RIA - Research & Innovation Action

Budget

1.398.127 €

Duration

36 months

State and Coordinator Entity

PORTUGAL

Universidade Católica Portuguesa

UNIVERSIDADE CATÓLICA PORTUGUESA

Scientific Officer:
CASTRO, Paula

Participating States/ 7

Research Units/ 12

Section II

17. ReCROP

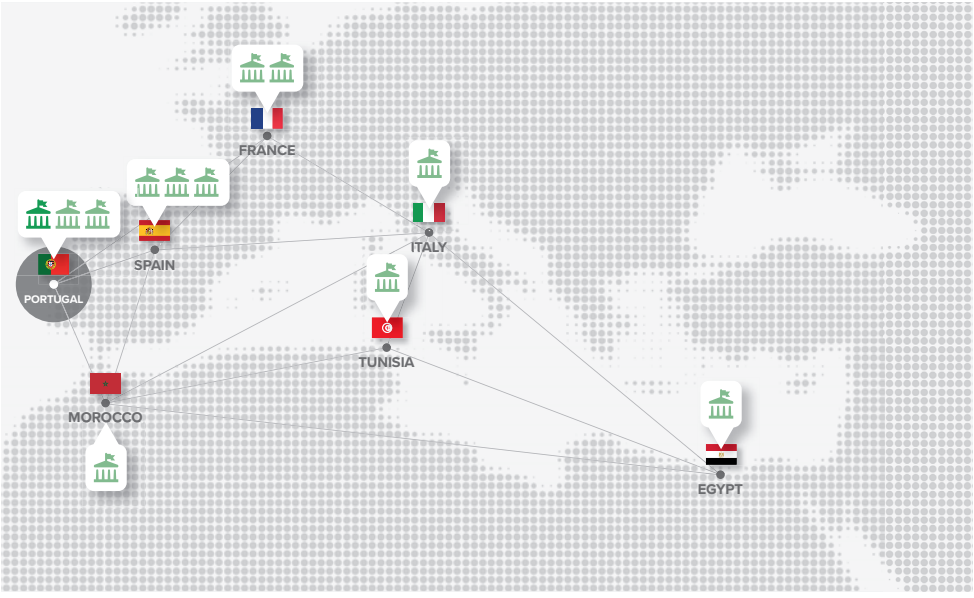
Bioinocula and CROPping systems: an integrated biotechnological approach for improving crop yield, biodiversity and Resilience of Mediterranean agro-ecosystems

Context

Agricultural productivity and sustainability in the Mediterranean region are under serious threat due to climate change, soil degradation, and depletion of water resources. This scenario is worsened by poor management practices, including the overuse of chemical fertilizers and pesticides, overgrazing, and monoculture farming. Intensive agricultural systems have a major impact on the loss of organic matter and biodiversity in farmlands while favouring erosion, compaction, and contamination of soil.
To ensure sustainable crop production for a growing population, it is vital that the design of agricultural systems is remodelled, favouring conservation agriculture. Preserving and improving the quality and fertility of agricultural lands, using greener tools such as the application of tailored bio inoculants, amendments, and cropping schemes will allow farming systems to withstand extreme climatic events while increasing crops' resilience to soil degradation by improving below and aboveground biodiversity, fertility, and water conservation.

Objective and contents

ReCROP aims at fostering the sustainability and resilience of agricultural production systems in the Mediterranean region through the combined use of biotechnological tools, such as bio inoculants (mycorrhizal fungi and plant growth-promoting bacteria), and environmentally friendly agronomic practices, including plant intercropping and crop rotation, application of amendments, as well as the use of locally adapted and/or tolerant varieties. It further intends to characterize from a socioeconomic perspective the main drivers to encourage farmers to switch towards greener practices and promote their acceptability and foster innovative sustainable solutions for ecological farming systems involving the views of local stakeholders. Regarding the economic perspective, different tools will be proposed to allow conventional farmers to switch towards greener practices without compromising economic revenues and profit, through monetary means/subsidies and non-monetary means.
With this integrated strategy, ReCROP targets the (i) improvement of soil physico-chemical and biological properties; (2) boost of crop productivity; (3) reduction of



Other Entities/ 11

Associação Desenvolvimento da Viticultura Duriense, Portugal
Scientific Officer: CARLOS, Cristina

Instituto para o Desenvolvimento Agrário da Região Norte, Portugal
Scientific Officer: ALVES, Rosário

Fayoum University, Faculty of Agriculture, Department of Soils and Water, Egypt
Scientific Officer: SHENDI, Mahmoud

Consejo Superior de Investigaciones Científicas (CSIC), Spain
Scientific Officer:
PRIETO FERNANDEZ, Ángeles

NEIKER Institute for Agricultural Research and Development , Spain
Scientific Officer: GARBISU, Carlos

BIOGENETICS SL, Spain
Scientific Officer: GAMBOA, Javier

Centre d'Ecologie Fonctionnelle et Evolutive, France
Scientific Officer: CORTET, Jérôme

University of Montpellier, Center for Environmental Economics - Montpellier, France
Scientific Officer: ROUSSEL, Sébastien

Centro Nazionale di Ricerca (CNR), Istituto di Ricerca sugli Ecosistemi Terrestri, Italy
Scientific Officer: D'ACQUI, Luigi Paolo

Université Cadi Ayyad, Laboratoire Aliments, Environnement et Santé, Faculté des Sciences et Techniques Guéliz, Morocco
Scientific Officer: BOULARBAH, Ali

Institut National Agronomique de Tunisia (INAT), Tunisia
Scientific Officer: TAOUFIK, Bettaieb

agrochemicals inputs, preventing runoff and groundwater contamination; (4) amelioration of water conservation.
This multilateral cooperation will provide evidence regarding best practices to overcome some of the most serious threats for agricultural Mediterranean systems.

Expected impact and results

ReCROP will impact Mediterranean farming systems by increasing the resilience of economically valuable crops to climate change and soil deterioration. The improvement of soil physicochemical and biological characteristics resulting from the combined application of microbial inoculants and sustainable farming practices will contribute to reducing the application of chemical fertilizers and promoting soil biodiversity and health. ReCROP will also benefit water conservation in the agricultural systems and alleviate the adverse impact of drought on crop yield.
Overall, ReCROP will favour soil health, which reflects the capacity of soil to respond to agricultural intervention, so that it continues to support both agricultural production and the provision of other ecosystem services in a sustainable way.
ReCROP will also provide useful insights on environmental smart policy instruments, regarding food security/safety, environmental and human health protection, facilitating the implementation of scientifically based, cost-effective actions. It will further provide farmers with evidence sustaining that a well-managed agro-ecosystem leads to increased sustainability of the farming system, and with guidelines and tools for its implementation in other cultures and geographical areas.

SPECIFIC OBJECTIVES

- implement and validate widely adaptable agro-ecological farming;
- devise new bioinoculant formulations to enhance soil biodiversity and functioning, plant health and yields of the target crops;
- provide a new tool based on omics technologies to help farmers in the decision-making process through the assessment of soil biodiversity profiles for prediction of crop suitability;
- characterize from a socio-economic point of view the main drivers to encourage farmers to switch towards greener practices and promote their acceptability;
- foster innovative sustainable solutions for ecological farming systems involving the views of local stakeholders and providing guidelines to improve the resilience of Mediterranean target crops.

Use of bioinoculants and best agronomic practices

Bioinocula (micorriza and bacteria)

Amendments (compost and biochar)

Crop rotation

Inbreeding

Thematic Area

Farming Systems

Section II

Topic - Re-design the agro-livelihood systems to ensure resilience

Action

RIA - Research & Innovation Action

Budget

1.277.728 €

Duration

36 months

State and Coordinator Entity

GREECE

Technical University of Crete

Scientific Officer:
PARANYCHIANAKIS, Nikolaos

Participating States/ 5

Research Units/ 6

Section II

18. RESCHEDULE

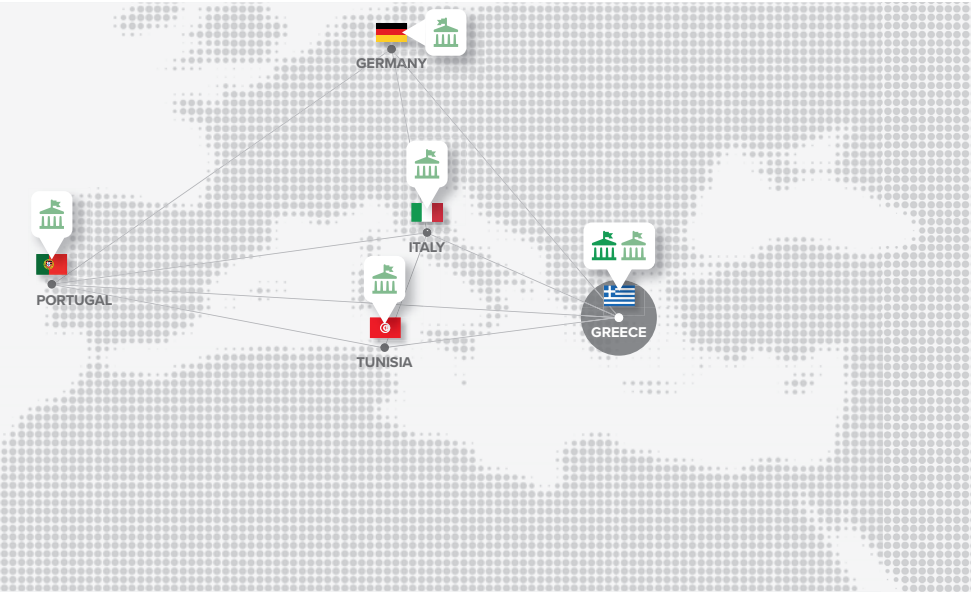
RESilient to Climate CHange Extremes MeDiterranean AgricUltural Systems: LEveraging the Power of Soil Health and Associated Microbiota

Context

The projected shifts in temperature and precipitation patterns are predicted to affect Mediterranean ecosystems currently functioning near their tipping points adversely. The risk of loss of essential services provisioned by agroecosystems because of climate change highlights the need to re-evaluate the conventional, input-dependent farming systems and identify transition pathways toward more resilient and sustainable farming systems.
In RESCHEDULE, we hypothesize that improvements in the adaptation of smallholder farms to climate change extremes in the Mediterranean Region at scales able to cause impact require the adoption of integrated and easily adjustable approaches that consider all the types of resilience (ecological, social, economic, institutional).

Objective and contents

RESCHEDULE principal goal is to develop scientifically-informed and locally-adapted solutions that improve the resilience of smallholder farms to climate change (SOM and nutrient depletion, desertification, erosion). Solutions targeting mainly on soil health restoration consistent with agroecology principles (no tillage, intercropping, tolerant to abiotic factors genotypes, soil microbiota) will be evaluated in an environmental gradient to design appropriate transition pathways of resilient and sustainable smallholder farms. It considers particularities in cropping systems (perennial vs annual) and environmental conditions for developing tailored solutions by implementing activities rooted in agroecology principles. Activities will investigate solutions with medium- to long-term adaptation potential focusing on the evaluation of drought and heat tolerant varieties/rootstocks and root microbiomes. Soil modelling simulations will be performed at the scale of the individual field for the evaluated technological adaptations, allowing the development of decision supporting systems (DSS) to expand the outcomes to longer timescales and different scenarios of climate change. RESCHEDULE adopts a hierarchical strategy that considers incremental, and transformative adaptations. Our insights on the effects of climate change are theoretically evaluated before their extensive evaluation in three experimental sites (GR, IT, TUN) characterized by contrasting conditions (cropping systems, social background



Other Entities/ 5

ZenAgro PC, Greece
Scientific Officer:
PAPAFILIPPAKI, Androniki

Helmholtz Centre for Environmental Research, Germany
Scientific Officer: FRANÇOIS, Buscot

Consiglio Nazionale delle Ricerche (CNR), Istituto per la Protezione Sostenibile delle Piante
Scientific Officer: BALESTRINI, Raffaella

University of Évora, Portugal
Scientific Officer:
PINTO CORREIA, Teresa

Centre of Biotechnology of Borj-Cédria, Tunisia
Scientific Officer: MNASRI, Bacem

economic prosperity, climate). To extend the outcomes of experimental sites in the long-term, modelling tools are employed under different climate change scenarios (RCPs) at the Global Change Experimental Facility (DE). Transition pathways are then evaluated to propagate the spread of adaptation strategies at larger scales.

Expected impact and results

RESCHEDULE outcomes are expected to strongly impact the adaptation of the Mediterranean smallholder farms to climate change through the evaluation, transformation, and promotion of ecological-friendly solutions targeting SOM restoration and soil microbiota. RESCHEDULE activities also minimize the adverse effects of smallholder farms on critical resources (soil, water), leading to positive impacts on a broad spectrum of societal challenges, including human health, environmental quality, food security, land degradation, and economic prosperity. RESCHEDULE also impacts other dimensions, including science, social policy and capacity building and knowledge development. For instance, RESCHEDULE will narrow the existing data gaps (crop-specific data, soil profile data). Also, RESCHEDULE impacts are not limited strictly to the agricultural sector but can be propagated with scales and benefit the environment and society. A large-scale transition to conservation practices restricts diffused pollution, improves the quality of waterways, increases yields, decreases energy usage, reduces GHGs, and protects public health. The sustainable management of Mediterranean soils promoted by RESCHEDULE will reduce poverty and support the economic growth of rural communities by making smallholder farms more profitable, generating conditions for the establishment of new SMEs. Finally, RESCHEDULE capitalizes on scientific advances that will be achieved to raise greater awareness, share information, advance knowledge, and promote technology transfer to stakeholders and forming opinions in civil society through the intensive dissemination and communication plan.

SPECIFIC OBJECTIVES

- Evaluate strategies that effectively restore soil health, the cornerstone of agricultural production and the farms' resilience to climate change and variability in different environmental settings and cropping systems.
- Elucidate the role of soil microbiota in restoring/maintaining ecosystem services (e.g., crop yield, nutrient cycling) and use co-occurrence networks and network structure modelling to understand better the stability and interaction of microbial communities under different scenarios.
- Expand the outcomes of divergent adaptation practices on ecosystem services at timescales relevant to adaptive farm management (>10 yrs) through model projections under different climate change scenarios.
- Develop and evaluate indicators (ecological, social, economic) of smallholder farms resilience and sustainability that address complexities and weaknesses.
- Enhance the engagement of small farmers and other key stakeholders and actively involving them in the co-construction of all steps and validation of interventions.
- Raise stakeholders' awareness, access to knowledge, tiny family farmers, and new generations, emphasizing networking structures and on-farm, user-friendly DSS.
- Upscale the RESCHEDULE outcomes to other Mediterranean areas through a cross-country dissemination strategy and the DSS that account for differences in environmental, economic and social factors.
- Integrate the science-based knowledge and communicate outcomes to local, regional, and (trans)national decision-makers and institutions, improving the opportunities to incorporate them into policy tools.

Thematic Area

Farming Systems

Section II

Topic - Re-design the agro-livelihood systems to ensure resilience

Action

RIA - Research & Innovation Action

Budget

827.835 €

Duration

36 months

State and Coordinator Entity

ITALY

Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria (CREA), Centro di Ricerca Viticoltura ed Enologia

Scientific Officer:
PERNIOLA, Rocco

Participating States/ 6

Research Units/ 15

Section II

19. REVINE

Regenerative agricultural approaches to improve ecosystem services in Mediterranean vineyards

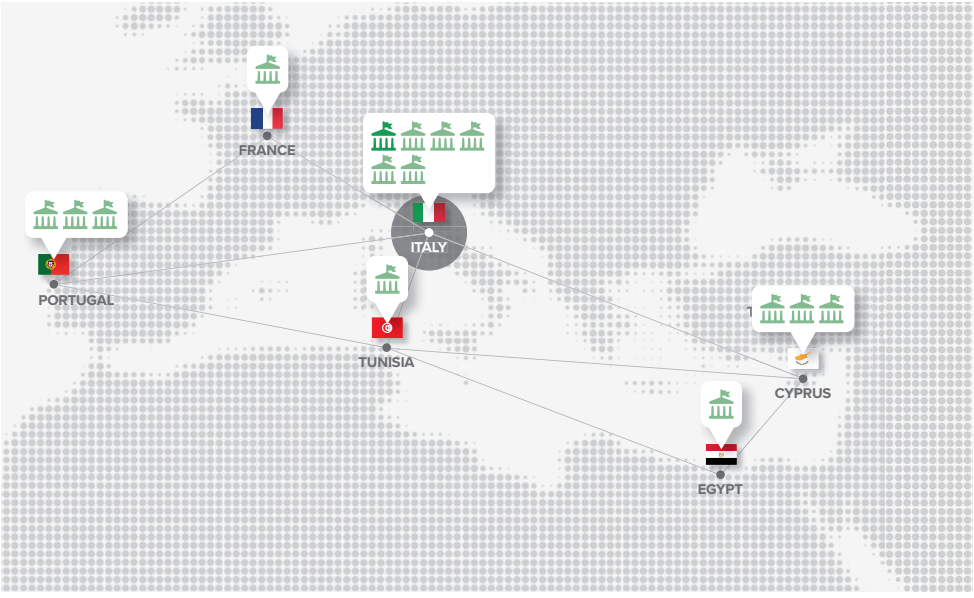
Context

The possibility to apply sustainable agriculture is influenced by enhancing the environment it operates. Due to the excess use of chemical inputs, modern agriculture has enormously reduced the agroecosystem's biodiversity, thus lowering plants' ability to adapt to a changing environment.
On the contrary, regenerative agriculture practices may favour soil health and biodiversity and benefit from the presence of other living organisms linked to synergistic and antagonistic relationships, such as rhizobacteria that promote plant growth (PGPR) and fungi (PGPF). Therefore, the REVINE project aims to increase the Vitis reliance on biotic and abiotic stresses by using regenerative cultivation approaches to favour the biodiversity of the viticultural agro-system (both table and wine grapes) in the Mediterranean Area.
REVINE, combining new knowledge of physiology, pathology, genomics, together with innovative applications in cultivation processes and management, intends to prove that the application of regenerative agricultural practices directly in viticulture companies located in Mediterranean areas can preserve water resources and soil fertility, controlling its erosion and creating physical-chemical conditions of the soil that favour the presence of beneficial microorganisms, thus obtaining a better adaptation to climate change.

Objective and contents

The general aim is to provide more eco-sustainable alternatives for soil management and plant defence in viticulture, thus reducing chemical inputs and improving food safety and plant health. REVINE proposes to:

- Enhance vineyard wastes, developing protocols that efficiently produce biochar, compost and digested from pomaces and pruning residues, thus allowing the re-use of these residues as amendments and biofertilizers (circular economy approach);
- Characterize the effect of the produced biochar and digested on the soil microbial community and vines in response to biotic and abiotic stresses.



Other Entities/ 14

Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile, ENEA, Italy
Scientific Officer: ALAGNA, Fiammetta

Consorzio Nuove Varietà di Uve da Tavola, Italy
Scientific Officer: SUGLIA, Giacomo

Società Agricola D'Alessandro ss, Italy
Scientific Officer:
D'ALESSANDRO, Angela

Azienda Agricola San Marco ss, Italy
Scientific Officer: PERNICE, Stanislao

ERMES sas, Italy
Scientific Officer: SUGLIA, Nicola

Cyprus University of Technology, Cyprus
Scientific Officer: KANETIS, Loukas

Vasiliko Oinopoieio Kyperoundas Ltd, Cyprus
Scientific Officer: MINA, Minas

Vlassides Winery Ltd, Cyprus
Scientific Officer: VLASSIDES, Sofoklis

Agricultural Research Center, Egypt
Scientific Officer: ZAWAM, Hanaa S.

Burgundy School of Business, France
Scientific Officer:
GEORGANTZIS, Nikolaos

FCiências.ID - Associação para a Investigação e Desenvolvimento de Ciências, Research centers: Biosystems and Integrative Sciences Institute (BioISI)/ Marine and Environmental Sciences center (MARE), Portugal
Scientific Officer: FIGUEIREDO, Andreia

AVIPE - Associação de viticultores do concelho de palmella, Portugal
Scientific Officer: CACHÃO, Miguel

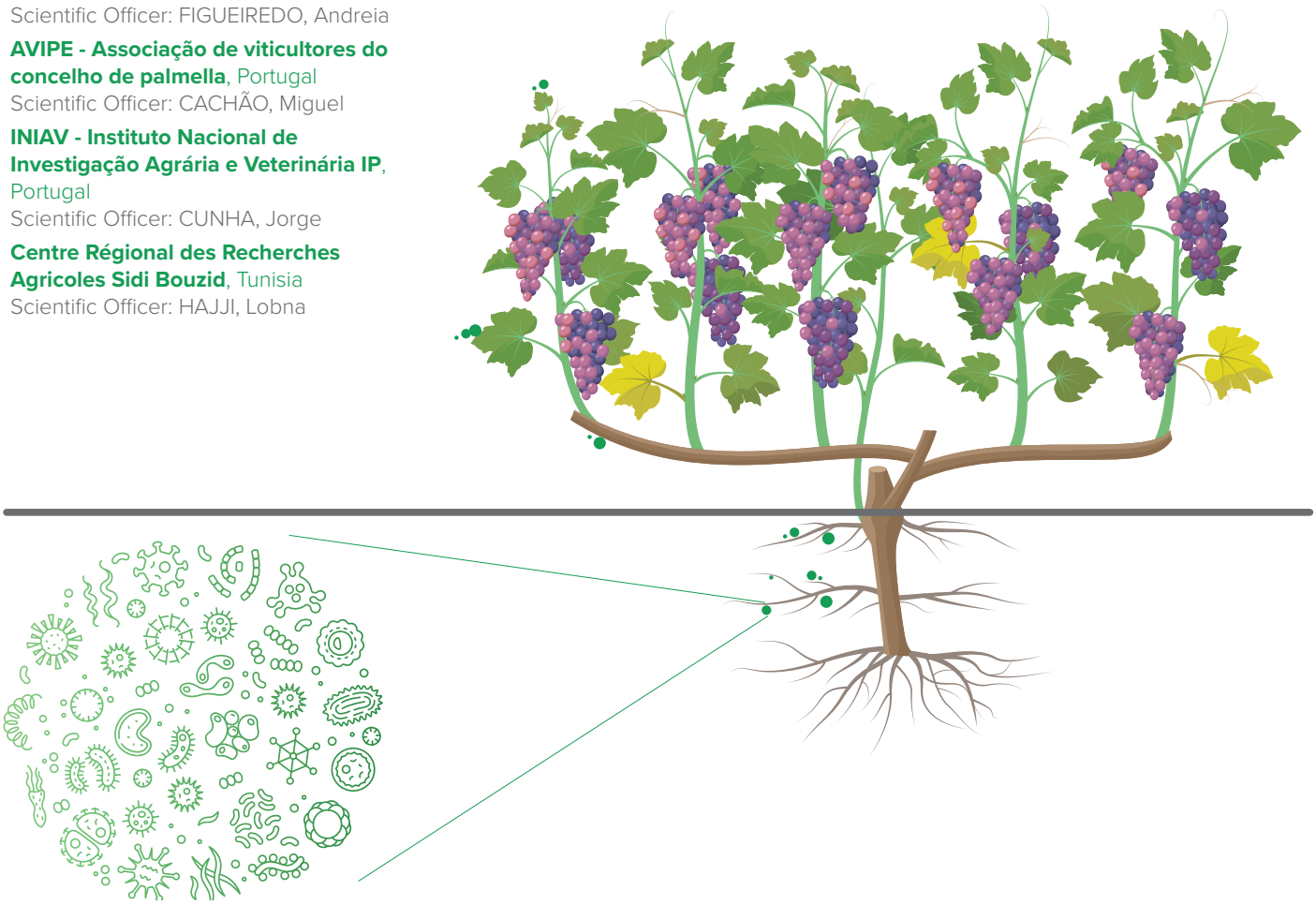
INIAV - Instituto Nacional de Investigação Agrária e Veterinária IP, Portugal
Scientific Officer: CUNHA, Jorge

Centre Régional des Recherches Agricoles Sidi Bouzid, Tunisia
Scientific Officer: HAJJI, Lobna

- Characterize the effect of beneficial microorganisms existing in the microbial collections available from project partners on the ability of vines to cope with biotic and abiotic stresses;
- Study the Vitis genotypes tolerant/resistant to diseases and abiotic stresses already adapted to the pedo-climatic conditions of Mediterranean areas;
- Identify the species more suitable for use in associations with the vine, capable of increasing the farm's profitability;
- Evaluate the environmental and economic sustainability of the proposed regenerative approaches and their socio-economic impact in the Mediterranean areas under study and evenly elaboration a proposition within the framework of the new Green Deal and the forthcoming Community Agricultural Policies.

Expected impact and results

About 20% of production costs in viticulture is related to fungicides use. This may strongly reduce the development of new eco-sustainable strategies for grape production, as we propose in REVINE. We expect results both as new products (such as new tolerant/resistant genotypes, microbial consortia, etc.) and new protocols for more sustainable vineyard management. These will allow the reduction of costs needed for production and defence management in the companies directly involved in the project and, as future perspective, a better adaptation of the company supply to the market demand, thus increasing competitiveness of the whole chain in the markets in which it already operates, and beneficial effects both in economic and employment terms for companies in the Mediterranean region.
With a view to a circular economy, REVINE will promote the enhancement of vineyard waste, developing protocols to produce biochar, compost and biofertilizers starting from pomaces and prune residues.
The direct involvement of companies in the project will allow the dissemination and exploitation of the proposed innovations to significant areas in the Mediterranean. Indeed, new tolerant grape genotypes may arouse the interest of Mediterranean producers and winegrowers because directly selected in those areas, therefore more adapted to pedo-climatic Mediterranean conditions, for sustainable production.



Thematic Area

Farming Systems

Section II

Topic - Re-design the agro-livelihood systems to ensure resilience

Action

RIA - Research & Innovation Action

Budget

1.183.000 €

Duration

36 months

State and Coordinator Entity

GREECE

Hellenic Agricultural Organization,
Department of Apiculture

HELLENIC AGRICULTURAL ORGANIZATION "DEMETER"

Scientific Officer:
HATJINA, Fani

Participating States/ 8

Research Units/ 13

Section II

20. SafeAgroBee

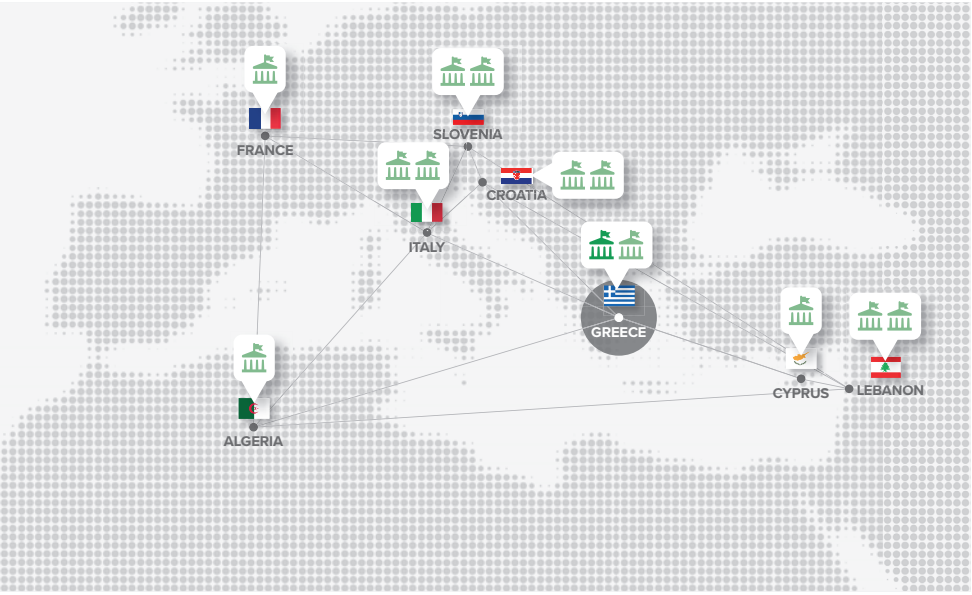
Safeguarding agroecosystem's resilience under climate change through efficient pollination and sustainable beekeeping

Context

The Mediterranean Basin is characterised by diverse agricultural management systems and climate differences from very dry and hot to humid and cold areas. Climate change, among other stressors, threatens wild pollinators, influencing the complexity and stability of pollinators' communities. Preserving the landscape structure, the resilience of bees and other pollinators and promoting sustainable beekeeping practices are essential elements for redesigning the agroecosystem. By testing the adaptability of local populations, we will provide solid recommendations and ensure or increase the resilience of the agroecosystems while reducing colony losses. We aim to evaluate farming strategies that foresee the presence and the interactions among Apis and non-Apis bees to increase crop productivity. We are assessing the landscape pollination demand and pollination supply provided by both managed and unmanaged bees. We will address these topics by setting the pollination services Apis and non-Apis bees feed on different crops considering scenarios linked to climate, landscape structure, and complexity. Resilient 'agro-ecological systems' will be ensured considering both the beekeepers' and the farmers' perspectives.

Objective and contents

The overall aim of SafeAgroBee is to contribute to the adaptation and mitigation of the effects of drivers negatively influencing the sustainability and the resilience of the agricultural system in the Mediterranean basin. Our goals are a) to contribute to knowledge on the adaptation of bees to their local niches; b) to contribute to the mitigation of the effects of climate change and other drivers negatively influencing the sustainability and the resilience of the agricultural system in the Mediterranean basin, c) to develop strategies and tools ensuring the income of farmers and food security; d) contribute to SDGs; e) to develop other innovative precision apiculture systems and intelligent digital technologies as well as different modelling tools, to advance in technology, enable the analysis of complex information about the behaviour of bees, as well as to harmonise the data for scenario analysis and provide recommendations.



Other Entities/ 12

TERRA SPATIUM SA, Greece
Scientific Officer:
STATHOPOULOS, Vassilios

University of Boumerdes-Department of Agronomy, Algeria
Scientific Officer: ADJLANE, Noureddine

Cyprus University of Technology, Cyprus
Scientific Officer:
STAVRINIDES, Menelaos

University of Zadar, Department of Ecology, Agronomy and Aquaculture, Croatia
Scientific Officer: FILIPI, Janja

University of J.J. Strossmayer in Osijek, Faculty of Agrobiotehnical Sciences, Croatia
Scientific Officer: STIPESEVIC, Bojan

Université Paris-Saclay, CNRS, IRD, UMR- Évolution, Génomes, Compartement et Écologie, France
Scientific Officer: REQUIER, Fabrice

Università degli Studi di Brescia, Dipartimento Medicina Molecolare e Traslazionale, Italy
Scientific Officer: GILIOLI, Gianni

ACME21 srl, Italy
Scientific Officer: PASI, Roberto

Lebanese Agriculture Research Institute, Lebanon
Scientific Officer: DANY, Yammouni

Lebanese University, Faculty of Agriculture, Lebanon
Scientific Officer: DARAZY, Dalida

Agricultural Institute of Slovenia, Dept of Animal production, Slovenia
Scientific Officer: PRESERN, Janez

National Institute of Biology, Slovenia
Scientific Officer: ZUNIC KOSI, Alenka

Expected impact and results

Scientific Impact: Increase knowledge on a) using Apis and non-Apis bees/ other pollinators for ensuring sustainable local crop production through providing pollination services; b) honey bee colony productivity and beekeeping management strategies; c) trends on effects of climate change on Apis and non Apis bees and other pollinators; d) minimising colony losses and risks from pollination adequacy; e) predicting the Health Status and productivity of a honey bee colony; f) protecting local biodiversity and their adaptability.
Societal Impact: a) enhance citizens' and policy makers' engagement in problem analysis, solving and decision making; b) strengthen the farmer-beekeeper relationship for the benefit of all and food security; c) raise awareness on the importance of bees and pollinators/ the need for preservation of local healthy populations.
Economic Impact: Increase marketing potential of precision apiculture tools; b) advance in innovation; c) optimise of land resources exploitation; d) increase job offers; e) ensures sustainability of income to farmers and beekeepers.

SPECIFIC OBJECTIVES

- Examine the resilience of bee pollinators (Apis and non Apis bees) on a changing environment towards pollination services and productivity by a) documenting wild and domesticated bee contribution to the pollination of key crops; b) determining the carrying capacity of several crops as a novel approach for bee productivity and c) by projecting historical climatic data and bee related data in today's conditions;
- Investigate the adaptability of local bee populations and the application of optimal practices under climate change in order to ensure sustainable beekeeping by monitoring the development and the performance of local populations and their resistance to diseases for long periods;
- Support the development of mitigation strategies ensuring the health of the bees and provide advice for the beekeepers by comparing the health and productivity of the honey bee colonies between different agricultural ecosystems and by performing alternative and new strategies to control bee diseases;
- Develop innovative monitoring tools and precision apiculture systems for advanced data acquisition by building on sounds, bee movements and heat detection, also enhancing business potential;
- Test and validate novel models for predicting the health of the bees, as for example the Health Status Index, as well as their productivity in terms of honey and pollination services based on two strong conditions, i) on previous experience, developments and knowledge and ii) on the large data sets with very accurate data and from diverse climatological conditions;
- Adopt a Citizen Science approach to interact and collaborate with all stakeholders and the citizens, thus performing a multi-actor approach at all levels; furthermore by forming an active Advisory Board we ensure extra scientific support and input in re-designing farming strategies to stakeholders' needs.

Thematic Area

Farming Systems

Section II

Topic - Re-design the agro-livelihood systems to ensure resilience

Action

RIA - Research & Innovation Action

Budget

815.310 €

Duration

36 months

State and Coordinator Entity

SPAIN

Centre de Ciència i Tecnologia Forestal de Catalunya

CTFC

Scientific Officer:
SEBASTIA ALVAREZ, Teresa

Participating States/ 5

Research Units/ 6

Section II

21. SUSFORAGE

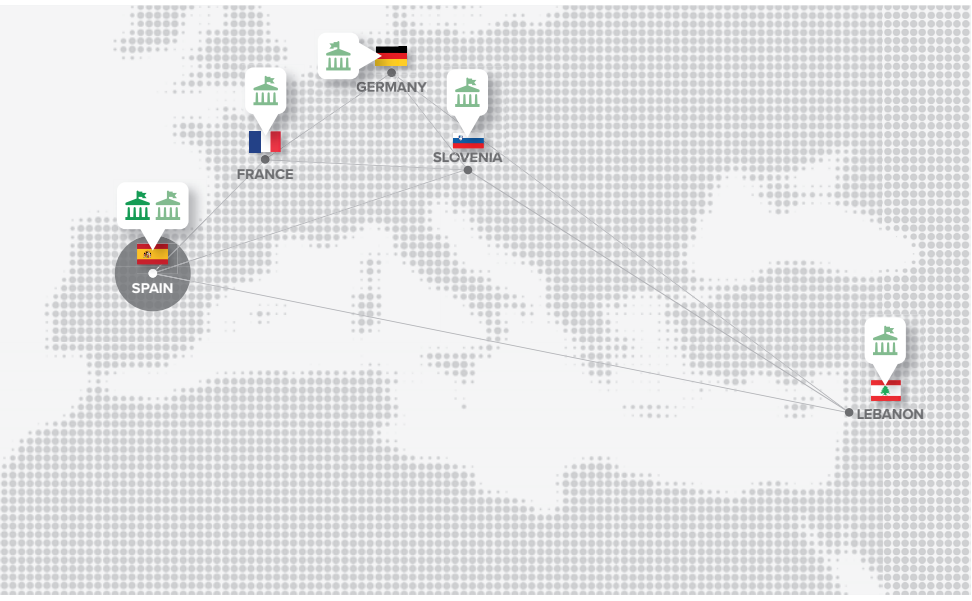
Sown forage mixtures for sustainable agroecosystems in the Mediterranean area

Context

Sown forage mixtures have advantages compared to monocultures, including higher productivity and quality forage, enhanced yield stability, lower susceptibility to pests, reduced nitrogen need, decreased greenhouse gas emissions. Mixtures have shown increased soil fertility and water use efficiency and are expected to affect soil biodiversity and function positively. However, a better understanding under extreme conditions and drought is still needed in vulnerable climates, including the Mediterranean. This is particularly important as there is a trend in losing mixtures favouring grass monocultures in this area. There might be barriers to the implementation and spread of sown varieties. Furthermore, there is a lack of information about the effects of grazing in mixed poly cropping-livestock systems, yet grazing systems are critical in many Mediterranean areas.

Objective and contents

The overall aim of SUSFORAGE is to determine technical and socioeconomic opportunities and barriers on the transition from monocultures to diverse sown forage crops in poly cropping-livestock sustainable farming systems across a wide range of climates, to develop locally adapted performance models under climate change conditions in the Mediterranean.
SUSFORAGE combines experimental results with socio-ecological multi-actor activities and modelling to assess the advantages and viability of poly cropping-livestock systems and investigate the underlying mechanisms associated with the optimized performance of mixtures, including the links between sown crop diversity and soil microbial activity and diversity. Based on the cutting-edge investigation, SUSFORAGE wants to propose the best management practices of grazed sown diverse crops for forage provisioning, climate change adaptation and mitigation in the Mediterranean region.
SUSFORAGE proposes the establishment of 5 Case-Study Regions across a climatic gradient, where socio-ecological surveys will be carried out and 4 experimental forage swards will be established.



Other Entities/ 5

Ecological and Forestry Applications Research Centre, Spain
Scientific Officer:
RIBAS ARTOLA, Àngela

Humboldt-Universität zu Berlin, Germany
Scientific Officer: RUEß, Liliane

Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement (INRAE), France
Scientific Officer: KLUMPP, Katja

University of Balamand, Lebanon
Scientific Officer: EL BALAA, Rodrigue

Agricultural Institute of Slovenia, Slovenia
Scientific Officer: ŽNIDARSIC, Tomaž

The swards will include a range of sown proportions and monocultures of the most commonly used local forage species to develop models of optimal adaptive mixture proportions under given climatic conditions. Several ecological indicators will be measured at all sites during the development of the systems.

Expected impact and results

SUSFORAGE is essential for improving agricultural management systems in Mediterranean countries, hampered by human effects, including climate change and the socio-economic situation. In particular, the expected impacts are:

- Offering the best alternative system to minimize the risk of failure associated with the loss of ecosystem goods and services in monocultures by investigating the role of sown diversity in mixtures under grazing conditions and a range of climates;
- Encouraging the adoption of those environmentally sustainable agroecosystems by demonstration of experimental plots to stakeholders, and the assessment of perceived benefits and risks by stakeholders in multi-actor activities, including the perception by gender;
- Quantifying increases in water use efficiency, soil fertility, and other ecosystem services of poly cropping-livestock systems by assessing the best combinations of forage species and proportions across a wide range of climates;
- Assessing the expected increase in income and satisfaction by farmers through a demonstration in experimental fields combined with stakeholder activities in socio-ecological studies;
- Comparing stability and quality of the multiple investigated goods and services in monocultures and polycultures by repeating measurements throughout the development of the project in different years and across a range of climatic and other environmental conditions.

SPECIFIC OBJECTIVES

- Assessing the delivery of goods and services of poly cropping-livestock systems, including yield, nutritious feed, soil diversity and fertility, water use efficiency, pest regulation, climate change mitigation, and crop stability and resilience against climatic uncertainties;
- Designing sustainable poly cropping-livestock systems to increase farming competitiveness and capacity for adaptation;
- Investigating the feeding value of forages in poly cropping-livestock systems and how to incorporate those into the diets for livestock;
- Developing mathematical models to determine the best regionally adapted composition and proportion of sown species to guarantee resilience and stability of highly nutritious, locally produced forage in the face of a changing climate;
- Identifying technical and socioeconomic opportunities and barriers to the establishment of poly cropping-livestock systems by involving local stakeholders in Case Study regions, including gender factors, to achieve a holistic agro-livelihood system re-design.

Section II

22. TRANSITION

Innovative resilient farming systems in Mediterranean environments

Thematic Area

Farming Systems

Section II

Topic - Re-design the agro-livelihood systems to ensure resilience

Action

RIA - Research & Innovation Action

Budget

1.149.450 €

Duration

36 months

State and Coordinator Entity

SPAIN

Fundació Universitària Balmes, Universidad de Vic - Universidad Central de Catalunya

UVIC
UNIVERSITAT DE VIC
UNIVERSITAT CENTRAL
DE CATALUNYA

Scientific Officer:
MARKS, Evan

Participating States/ 6

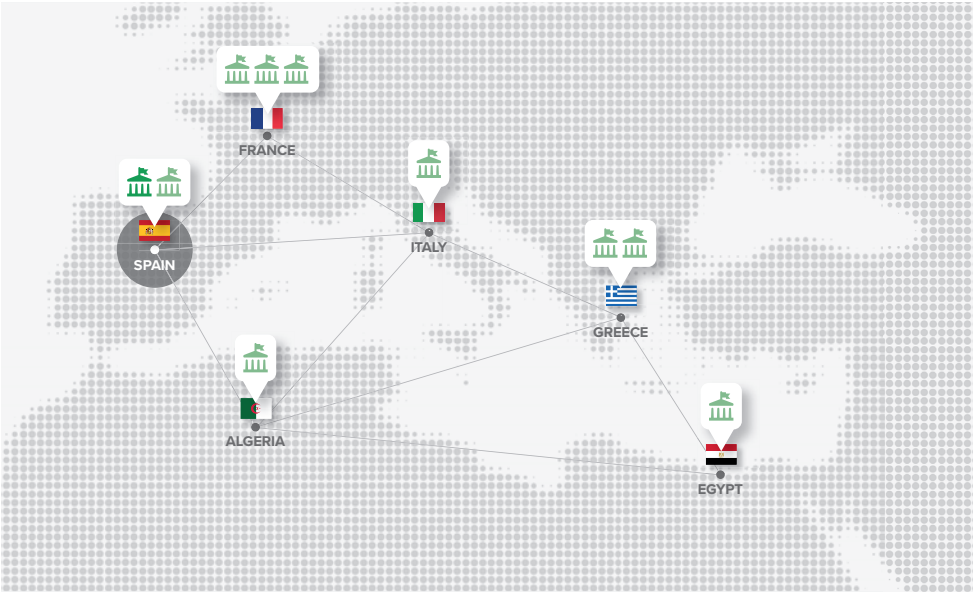
Research Units/ 10

Context

Advancements in resilient agriculture are fragmentary, with different initiatives aiming to boost implementation. It will be necessary to develop knowledge and methods to support the design and evaluation of more climate-resilient farming systems scenarios, mainly at the farm level. Insufficient Mediterranean initiatives are comparing empirical environmental and socio-economic results-producing knowledge that can be applied more widely. Also, these results must be transferred adequately, bridging the gap between geographic and policy levels required to achieve a basin-wide (Mediterranean) TRANSITION to more resilient and adaptive farming systems.
Agroforestry and mixed farming systems are lands use that are strategic to achieve economically competitive and environmentally sustainable agriculture, providing opportunities to minimize land abandonment, in turn diversifying landscapes and supporting ecosystem services (i.e., soil erosion mitigation, nutrient leaching and runoff, carbon sequestration and biodiversity enrichment). Combining traditional knowledge with modern but sustainable agriculture (using unconventional water sources, bio-based fertilisers, genetic resources) will boost the TRANSITION toward more resilient agriculture.

Objective and contents

The main goals of TRANSITION be optimized productivity, long-term biological, economic, and social sustainability, provision of multiple ecosystem services, and minimal environmental degradation. Modern agroforestry and mixed farming systems are farming options with great added value as compared to intensive monoculture - both economically and ecologically – promoting resilience and providing multiple ecosystem services. Farmers require replicable results which assure income equality, and administrations require evidence and data to drive sustainable intensification. Furthermore, these systems are compatible with other enhanced farming options such as organic or regenerative agriculture.
TRANSITION aims to pave the way for a transition towards resilient agriculture in the Mediterranean, maximizing the net positive impact on the environment while increasing the resilience of agroecosystems, rural societies and return on assets to farmers.



Other Entities/ 9

Forest Science and Technology Centre of Catalonia, Spain
Scientific Officer: COELLO, Jaime

Institute National de la Recherche Agronomique d'Algeria (INRAA), Algeria
Scientific Officer: BENIDIR, Mohamed

City of Scientific Research and Technological applications, SRTA-City, Egypt
Scientific Officer: RASHAD, Mohamed

Association Française d'Agroforesterie, France
Scientific Officer: CHARTON, Aurélie

Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement (INRAE), Unité de recherche Écodéveloppement, France
Scientific Officer: TCHAMITCHIAN, Marc

Landfiles, France
Scientific Officer: MINARY, Nicolas

National Observatory of Athens, Greece
Scientific Officer:
KONTOES, Charalampos

Edge in Earth Observation Sciences Monoprosopi Ike, Greece
Scientific Officer: TSOUNI, Alexia

Università degli Studi di Catania, Dipartimento di Agricoltura, Alimentazione e Ambiente, Italy
Scientific Officer: SCORDIA, Danilo

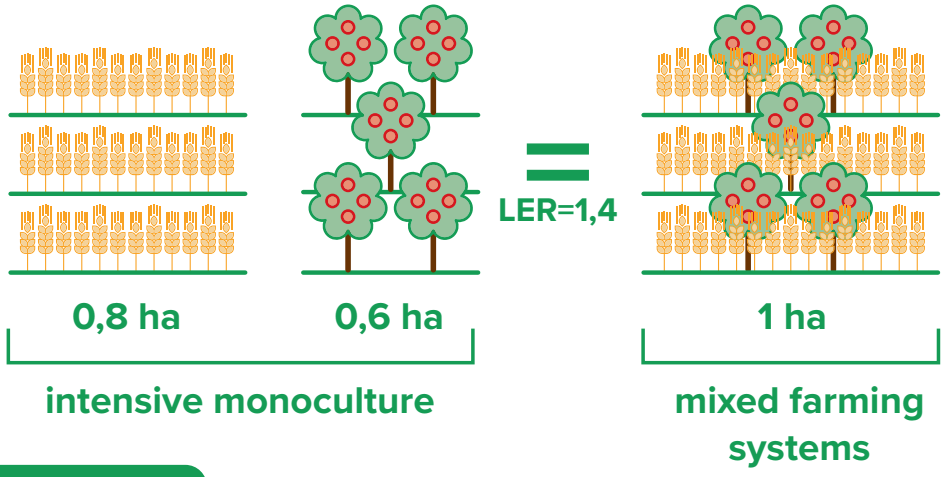
Expected impact and results

TRANSITION will help propagate systems that positively impact environmental and social indicators and further societal goals. TRANSITION will identify and address the regulatory, social, and economic barriers limiting the propagation of resilient agroecosystems. The results of the project will include:

- Increased propagation of environmentally, socially and economically sustainable;
- Increase agroecosystem resilience and diversification, helping assure farmer incomes;
- Win-win-win of increased soil fertility, climate resilience, and climate mitigation;
- Exploitation and policy guidance;
- Facilitating co-learning and coordination.

TRANSITION is positioned to induce increased resilience and adaptation in specific cropping and rangeland systems covering more than 1.1 M ha among the five pilot regions, but with potential for extrapolation to related farms in the Mediterranean Basin, helping these achieve more sustainable productions. One of the innovative strategies promoted in TRANSITION is water reuse and the use of unconventional water sources, a significant challenge for the Mediterranean. Also, another goal of the project is to identify and foster systems which build soil organic carbon (e.g., by at least 0.4%), in this way aligned with the "4 per 1000" Initiative and protection of soil health.

LER (Land Equivalent Ratio)



SPECIFIC OBJECTIVES

- Generate a framework for understanding resilience in Mediterranean agroforestry and mixed farming systems.
- Identify socio-economic and policy barriers limiting the replication of resilient farming systems, innovative strategies, and the use of biological resources in heterogeneous regions and landscapes.
- Assess the potential and help prioritise resilience-building strategies with technologies, genetic resources, unconventional water reuse, and soil protection strategies.
- Promote knowledge exchange and development of sustainable farming systems through the international deployment of a web-based interactive practice platform and data-sharing tool.
- Promote alignment between resilience-building priorities of stakeholders and policies of governmental and intergovernmental organisations.
- Provide a resilient farming system implementation roadmap to increase climate change resilience and mitigation and the sustainability of farming systems and livelihood protection.
- Ensure the viability and replicability of the resilience-building strategies after the project lifespan by exploitation planning with farmers, sector stakeholders, and regional administrations.

Thematic Area

Farming Systems

Section II

Topic - Re-design the agro-livelihood systems to ensure resilience

Action

RIA - Research & Innovation Action

Budget

791.180 €

Duration

36 months

State and Coordinator Entity

SPAIN

Consejo Superior de Investigaciones Científicas

CSIC
CONSEJO SUPERIOR DE INVESTIGACIONES CIENTÍFICAS

Scientific Officer:
RODRIGUEZ- CONCEPCION, Manuel

Participating States/ 4

Research Units/ 5

Section II

23. UToPIQ

Use of Tomato lines tolerant to Proximity shade to Increase yield and Quality in intercropping agrosystems

Context

Dramatic changes will need to be undertaken in the coming years for Mediterranean agriculture to face climate change challenges while improving sustainability. UToPIQ will create new cultivars amenable for intercropping, a farming practice that involves growing two or more crops near one another. Intercropping is remarkably resilient to climate change, as it can provide protection against strong winds and intense sunlight (e.g., by using tall crops), help slow the proliferation of pests (e.g., by using trap or repellent crops), reduce the need for fertilizers (e.g., by using nitrogen-fixing crops), and promote biodiversity. While careful planning can prevent crops from competing for space, water, nutrients, or sunlight, the toolbox of crop varieties amenable to this farming ecosystem is very limited. UToPIQ addresses this challenge by generating and testing shade-tolerant varieties of tomato (Solanum Lycopersicum), a shade-avoider crop with a central relevance for Mediterranean agriculture. Academic groups from Spain, Egypt, France, Italy and Morocco with expertise in plant biotechnology, abiotic and biotic stress, and sustainable agriculture will work together with stakeholders to take results from the lab to the field within the project's timeframe.

Objective and contents

We will translate our knowledge on how model plants either avoid or tolerate proximity shade to generate loss-of-function and gain-of-function alleles of relevant genes in tomatoes by CRISPR-Cas9 technology. We will also investigate whether proximity shade triggers the release of volatiles that influence the growth and development of potential nearby competitors and test whether facilitation (i.e., positive interactions among plants growing in communities) improves in shade-tolerant lines. The bulk of UToPIQ activities will evaluate the agronomic performance of the generated tomato lines in the greenhouse and open field settings.
We will use a commercial crop (maise) and an orphan crop (millet) to protect tomato plants from excess irradiation and pests for intercropping. We will test whether shade-tolerant tomato lines show enhanced resilience to abiotic and biotic stresses and pay special attention to fruit yield and nutritional, organoleptic and commercial quality at harvest and post-harvest stages.

Other Entities/ 4

Institut de Biosciences et Biotechnologies d'Aix-Marseille (BIAM-UMR 7265), France
Scientific Officer: HAVAUX, Michel

Università degli Studi di Napoli Federico II, Dipartimento di Agraria
Scientific Officer:
RIGANO, Maria Manuela

University Chouaib Doukkali, Faculty of Sciences, Morocco
Scientific Officer: MOHAMED, Faize

Observatory of the Marchica Lagoon of Nador, Morocco
Scientific Officer: BAGHOUR, Mourad

Along the process, we will also work together with farmers, breeders, entrepreneurs and consumers to develop new climate-ready crops with unprecedented precision and speed.

Expected impact and results

At the end of the project, we show that shade-tolerant lines represent an improvement for intercropping and other farming agrosystems involving closely interacting plants. It is important to note that the results from UToPIQ could be applied to generate new varieties of tomato and other crops without using gene-editing technologies (e.g., they could be produced by conventional mutagenesis, breeding and selection or TILLING once target genes are identified). By boosting the capacity to generate cultivars amenable to high-density and intercropping farming quickly, UToPIQ results will be instrumental for the transition towards more sustainable agriculture with improved resilience to climate change in the Mediterranean region. This will help save space, water, and other inputs and maintain productivity even after extreme drought, heat, or pest invasions while improving farmers' economic stability and addressing the critical challenges of food security and the acceptance of biotechnology.

Agronomic performance of the generated tomato lines in the greenhouse and open field settings, in intercropping with two different crops (maise and millet)

Thematic Area

Agro-food Value Chain

Section II

Topic - New optimization models of the agro food supply chain system to fair price for consumers and reasonable profit share for farmers

Action

RIA - Research & Innovation Action

Budget

938.096 €

Duration

36 months

State and Coordinator Entity

SPAIN

Universidad de Oviedo

Universidad de Oviedo
Universidá d'Uviéu
University of Oviedo

Scientific Officer:
GONZALEZ-DIAZ, Manuel

Participating States/ 5

Research Units/ 7

Section II

24. AGRICOMPET

Governing the agri-food supply chain: how to improve smallholders competitiveness

Context

The AGRICOMPET project emerges to address one of the most crucial knowledge gaps in the agri-food supply chain (SC) by answering the question: How can smallholder farmers and their producer organisations (POs) design sustainable organisational and managerial solutions to respond to their most pressing challenges? Systematically addressing this question is a prerequisite for achieving EU goals such as smart specialisation in rural areas, rural economic development, efficient and competitive food SCs. The underlying argument is that the success of producers in growing sustainably and retaining value at the local level depends crucially on the organisational and managerial solutions they have implemented. Moreover, these solutions must effectively overcome sectoral fragmentation (i.e., many small producers) and the lack of a customer-centric approach that burdens the farmer-to-fork SC's upstream stages. In this context, some of the challenges faced by smallholders are how to foster cooperation through competitive associations; manage internal conflicts and incentives within cooperatives, POs, and Geographical Indications (GIs); respond to sustainability requirements in the agri-food SC or identify the e-business models best suited to seize new market opportunities.

Objective and contents

AGRICOMPET focuses on two main ways of improving smallholder competitiveness and strengthening their position in the value chain. The first involves facilitating cooperation among small producers to pool resources and encourage collective action to improve their efficiency and bargaining power. The second way is to seize the new market opportunities from technology (e.g., e-commerce) and regulation (e.g., public procurement). Our research interests in the cooperation area are (1) the cooperatives and other POs and (2) the GIs as the fundamental tools for achieving cooperation and integration in agri-food SCs.

Our main goals here are:

- Identify, collect, benchmark, and evaluate:
  - pressing organisational and managerial challenges facing agri-food cooperatives,

Other Entities/ 6

University of La Rioja, Spain
Scientific Officer:
SALAZAR-TERREROS, Idana

Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement (INRAE), France
Scientific Officer: RAYNAUD, Emmanuel

Hellenic Agriculture Organisation-DEMETER, Greece
Scientific Officer:
ILIOPOULOS, Constantine

Università degli Studi di Verona, Dipartimento di Scienze Economiche, Italy
Scientific Officer: ZAGO, Angelo

Libera Unversità di Bolzano, Facoltà di Economia, Italy
Scientific Officer: SCHAMEL, Guenter

Bogazici University, Turkey
Scientific Officer: ÖZERTAN, Gökhan

- solutions addressing the root causes of these challenges, and
- organisational and institutional settings enable the implementation of such solutions efficiently;

- Provide innovative organisational solutions to GI governing bodies to improve KPIs for the GIs and their members;
- Assess how institutional differences between regions can influence the development and the success of GIs;
- Ascertain how GIs and cooperatives are reacting to the challenges of sustainability in the agri-food industry.

Our primary goals in the second research interest (new market opportunities) are:

- Identify which e-commerce solutions have been successfully implemented and are most appropriate for agri-food businesses, emphasising SMEs.
- Assess the effects of different mechanisms of public food procurement on farmers' participation in public markets and sustainability.

Expected impact and results

Our main expected result is a new menu of organisational and managerial solutions to improve cooperative enterprises and POs and the effectiveness of the European GIs as key local clusters for enhancing farmers' marketing strategies, collective reputation, and territorial sustainability. We also expect to offer new insights and commercial solutions to shorten distribution channels and facilitate entry into promising new markets for small farmers and their POs.
Although the impact will only be seen in the long term, it is expected that if cooperatives, GIs, and policymakers adopt the proposed solutions, the cooperation among smallholders will be more effective. This will result in enhancing their incomes and resilience and strengthening their bargaining power in the agri-food SC. Additionally, the insights about the new market opportunities will be especially relevant for improving farmers' commercialisation, one of their main weaknesses. Overall, AGRICOMPET will help improve the living standards of smallholders and will slow the rural exodus.

OPERATIONAL OBJECTIVES

- Identification of successful organizational and management solutions;
- Rationalization of these success cases;
- Co-creation of solutions adapted to particular contexts and challenges;
- Dissemination of the solutions identified among smallholders, producers organizations, practitioners, and policymakers to encourage their adoption.

Thematic Area

Agro-food Value Chain

Section II

Topic - New optimization models of the agro food supply chain system to fair price for consumers and reasonable profit share for farmers

Action

RIA - Research & Innovation Action

Budget

952.609 €

Duration

36 months

State and Coordinator Entity

GREECE

Centre for Research & Technology Hellas, Hellenic Institute of Transport

Scientific Officer:
AIFANDOPOULOU, Georgia

Participating States/ 5

Research Units/ 6

Section II

25. GourMed

Governance of food supply chain to equilibrate price and profits of high quality and safe Mediterranean foods

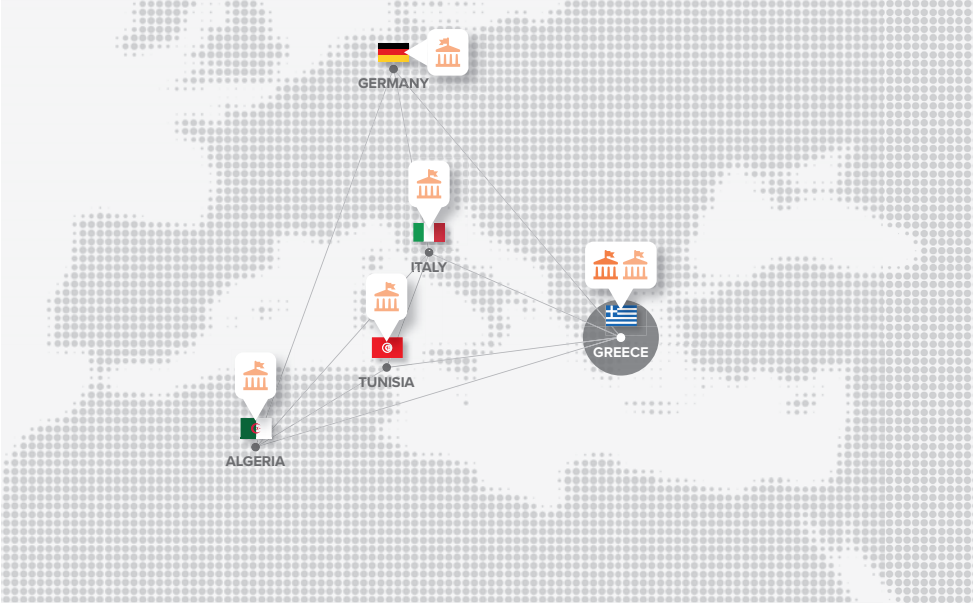
Context

Agri-food is the largest processing sector in the EU and is considered one of the main drivers of the Mediterranean economy in terms of economic output and employment. SME companies account for 99.1% of the Agri-food sector, with their value chains (VCs) facing several significant challenges, both at the EU and the South Mediterranean level. These challenges involve: (i) balancing future demand and supply sustainably, (ii) ensuring adequate stability in food supplies, (iii) mitigating the contribution of food systems to climate change & environmental impact, (iv) ensuring safe food for the consumers, (v) increasing transparency throughout the chain to reduce unfair trading practices, and (vi) increasing traceability to withdraw defective products quickly. With greater global demand for food, and less natural capital to sustain current agriculture and yield demands, the survival of small agri-food firms in the Med region is increasingly difficult. Thus, an urgent need arises for a more sustainable and resilient food value chain for all agri-food VC stakeholders, including consumers and smallholders.

Objective and contents

GourMed will provide new, innovation embedding, optimised governance and operational models of agri-food supply chains ensuring/aiming at food quality, profitability, and sustainability, to enhance value creation by Mediterranean value chains (especially vs cheap imports) and to balance power and value appropriation among Mediterranean VC actors.
To achieve its aim, the project will pursue the following detailed project objectives:

- Understand value creation & fair value appropriation in small-actor food value chains;
- Deliver a multi-actor strategy and its implementation tools to increase the competitiveness of MED agri-food chains;
- Implement and use real-life pilots to assess project impacts and validate outputs;
- Provide guidelines and criteria enabling sustainable Mediterranean agri-food chains.



Other Entities/ 5

University of the Aegean, Department of Food Science and Nutrition, Greece
Scientific Officer: ARGYRIOU, Anagnostis

University of Biskra "Mohamed Khider", Department of Agricultural Sciences, Algeria
Scientific Officer:
BENMEHAIA, Mohamed Amine

Institut für Energie- und Umweltforschung Heidelberg GmbH, Germany
Scientific Officer: DETZEL, Andreas

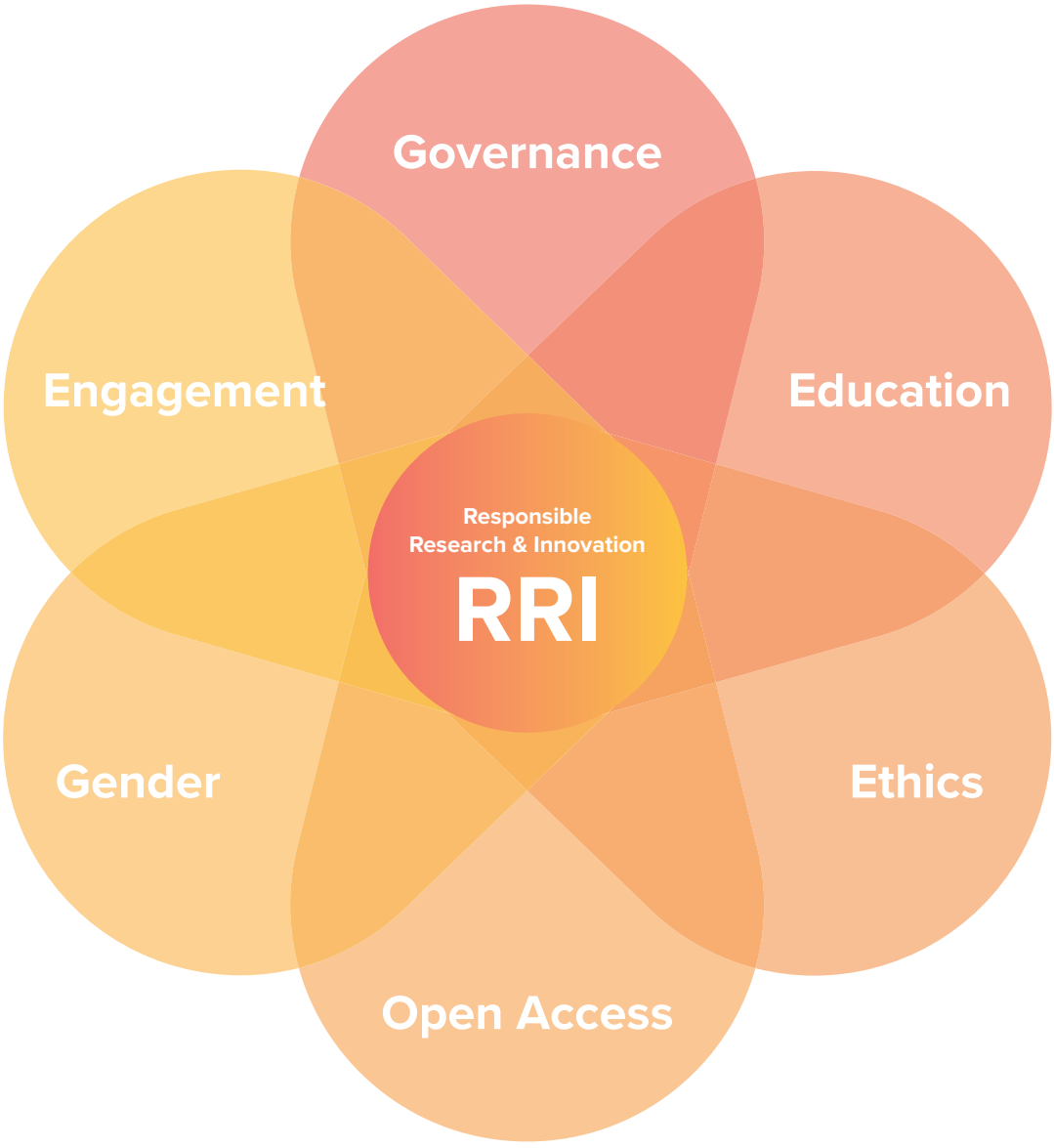
Università di Bologna, Dipartimento di Scienze e Tecnologie Agro-Alimentari, Italy
Scientific Officer: GIANOTTI, Andrea

Institut Supérieur de Biotechnologie de Monastir, Tunisia
Scientific Officer: ACHOUR, Lotfi

Expected impact and results

GourMed will lead to the realisation of seven significant effects:

1. Provide new technology tools and business models for access to markets suited to local clusters and SMEs.
2. Create a new generation of young entrepreneurs. Through webinars and capacity building workshops, and university courses.
3. Provide new insights into the competitiveness of local clusters of farmers, small manufacturers and distributors, with innovative integrated planning and institutional solutions for sustainability and profitability.
4. Provide new options to increase the added value of products from local clusters by delivering analytical methods for origin identification, safety, genuineness & typicality of MED food products, suitable for small actor clusters and structured KPIs to help identify the sustainable production & distribution of MED food products.
5. Enhance fair-trade transparency by testing blockchain solutions facilitating (among others) secure transactions, thereby also providing transparency in price formation and consumers' and smallholders' trust in fair trade prices and by producing products typically associated with the Mediterranean Diet formulated with environmentally sound & healthy ingredients fairly paid to farmers and defined in cooperation with consumers.
6. Enhance verified consumer feedback on the quality and safety of product
7. Implementation in 6 real-life pilots. GourMed project will assess the impacts and validate the project outputs through the 6 Value Chain demonstrators, including many external stakeholders. The examined products of the six pilots are: a) medicinal & aromatic plants, b) wheat, c) Emmer/einkor products, d) Mediterranean ready-to-eat meals, e) industrial tomatoes, and f) traditional local food products.



Thematic Area

Agro-food Value Chain

Section II

Topic - New optimization models of the agro food supply chain system to fair price for consumers and reasonable profit share for farmers

Action

RIA - Research & Innovation Action

Budget

1.334.393 €

Duration

36 months

State and Coordinator Entity

GERMANY

University of Duisburg-Essen,
Centre for Logistics & Traffic

Scientific Officer:
MELKONYAN, Ani

Participating States/ 6

Research Units/ 15

Section II

26. ImPUISe

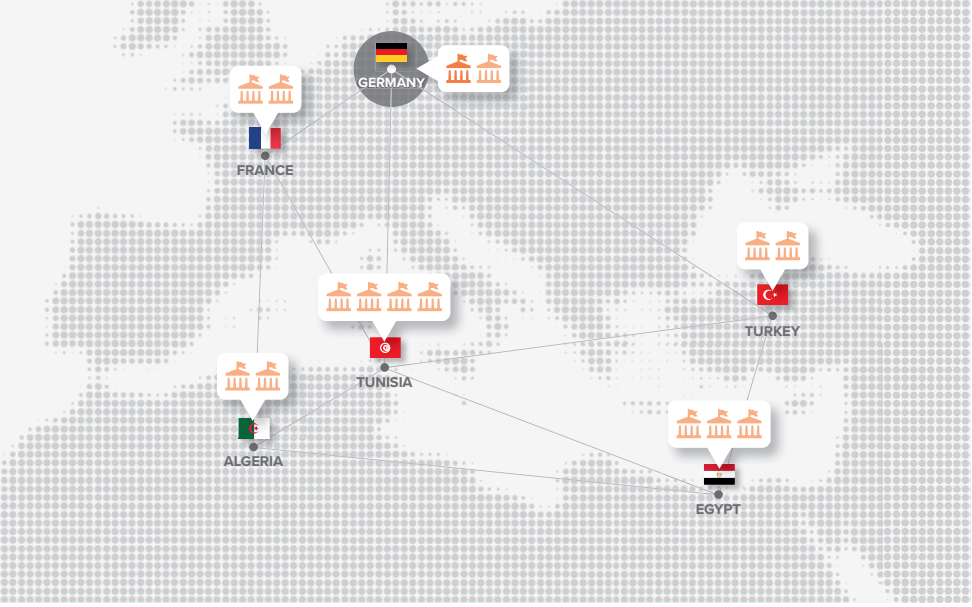
Innovation in the by-product supply chain of citrus in the Mediterranean area

Context

Efficient and effective supply chain management can benefit all stakeholders along the value chain, from raw material suppliers to end consumers. These benefits are, e.g., supply chain transparency, process efficiency, cost reduction, or innovative business models. Particularly in the context of environmental pressure, increasing market volatility and decreasing public sector investments in agriculture, the capacity of food system actors to apply innovation is crucial for achieving global food security. Transparency and trust can increase the adoption and spread of technical invention over larger areas, which will help to achieve the long-term impact of digital business transformation within circular economies. The effect will be significant in, e.g., increased agricultural output, higher environmental protection, and risk mitigation along food supply chains. Innovation can bring benefits also to the consumers, such as increased food safety and traceability. Yet, horizontal and vertical fragmentation of the value chain and lack of integration among actor's limit innovation adoption. Thus, the core question is how innovation can be fostered to overcome societal challenges, such as food security, regional economic growth and competitiveness, employment and quality of life, or environmental resilience. The lack of applied research on innovation adoption by the food supply chain actors, increase in operational efficiency through new business models provides a significant gap that ImPUISe aims to address.

Objective and contents

The overarching goals of the project are threefold: development of an (a) comprehensive framework for an increased adoption level of innovation; (b) set of quantitative tools and models to design an innovative and sustainable citrus (by-products) supply chain; (c) simulation-based scenario assessment system to ease the decision-making process for farmers, food processors, food distributors and policies. This will contribute to developing innovative and scalable business models, more effective market mechanisms, enhanced healthy competition among economic agents while respecting Mediterranean heritage and biodiversity. To achieve the goals, ImPUISe will develop an Information and Knowledge Hub (IKH), an integrated virtual knowledge



Other Entities/ 14

Emporium Partners, Germany
Scientific Officer: PINILLOS, Carlos

University of Tlemcen "Abou Bekr Belkaid", Département de Génie Electrique et Electronique, Algeria
Scientific Officer:
MELIANI, Sidi Mohamed

Le Group Amour, Algeria
Scientific Officer: AMOUR, Hamza

Alexandria University, Egypt
Scientific Officer: HARRAZ, Nermine

AgroMisr Company, Egypt
Scientific Officer:
ABDEL GHANY, Mostafa

Aal Shawky Farms, Egypt
Scientific Officer: SAID, Islam

Excelia Business School, France
Scientific Officer:
GONZALEZ FELIU, Jesus

Université Lyon 2, France
Scientific Officer: MORANA, Joëlle

University of Sfax, Tunisia
Scientific Officer: DHOUIB, Diala

International Greenway Trading Co., Tunisia
Scientific Officer: KOTTI, Mouna

Frigo Al Habib, Tunisia
Scientific Officer: MOHAMED, Makni

Karray International Trading, Tunisia
Scientific Officer: KARRAY, Khalil

Koç University, Turkey
Scientific Officer: TURKAY, Metin

Yenigun Gida, Turkey
Scientific Officer: ALPAGOT, Berkay

exchange and information sharing hub among stakeholders during the project period and beyond. The IKH will simultaneously function as an Innovation Platform for industry and a participation medium for companies. The outcomes of the IKH will serve as the necessary input for establishing an integrated Analytics and Decision Support System (ADSS). ADSS will capture and share information to better understand the challenges and requirements for innovation adoption among the actors within citrus (by-products) supply chains. It will further integrate computational sustainability assessment models, analyse market mechanisms, and plan the essential processes of the entire supply chain. This will result in standardisation and efficiency improvements for all participants.

Expected impact and results

ImPulSe aims to design new, innovative supply chains of citrus by-products in the Mediterranean area, considering the actors' current socioeconomic situation and digitisation progress. The development of possible scenarios will successfully integrate Mediterranean citrus production and distribution system within a circular economy, considering local values and heritage.
Using IKH and ADSS, ImPulSe will foster insights and better access to the market and increase awareness amongst stakeholders about the socioeconomic impacts of innovation adoption and the citrus (by-product) supply chain. Furthermore, this will increase integration along agri-food chains to promote product and process innovations, expansion to new markets, and product diversification concerning economic, environmental, and social sustainability.
ImPUlSe will support the actors engaged in citrus supply chains in identifying cooperation opportunities on overcoming barriers of commercialisation and industrial use of wasted products by sharing experiences and innovations among stakeholders. Managers of farmer associations, food processors and buyers will be equipped with agribusiness management skills, such as marketing, strategic procurement, logistics concept, food safety and standards, good agricultural practices and post-harvest handling, storage, and inventory management. In conjunction with the implementation of intelligent solutions, these training programs will create new job perspectives, increase employment in the sector and efficiency in water and energy consumption, and enhance the sustainability of the small-scale farming systems and preserve natural resources.

SPECIFIC OBJECTIVES

- Design new, innovative supply chains of citrus by-products in the Mediterranean area, taking into consideration the current socio-economic situation of the actors and digitisation progress.
- Address successful integration of Mediterranean citrus production and distribution system within a circular economy based on development of possible citrus supply chain scenarios, while considering local values and heritage.
- Prototype, test and demonstrate innovative citrus supply chain solutions in the pilot countries Algeria, Egypt, Tunisia and Turkey, based on experiences of the current state-of-the technology within circular economy applied in Germany and France.

Thematic Area

Agro-food Value Chain

Section II

Topic - New optimization models of the agro food supply chain system to fair price for consumers and reasonable profit share for farmers

Action

RIA - Research & Innovation Action

Budget

1.120.070 €

Duration

36 months

State and Coordinator Entity

SPAIN

Centre de Recerca en Economia Desenvolupament Agroalimentari

CREDA
CENTRE DE RECERCA EN ECONOMIA I DESENVOLUPAMENT AGROALIMENTARI

UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

IRTA

Scientific Officer:
KALLAS, Zein

Participating States/ 7

Research Units/ 9

Section II

27. LAB4SUPPLY

Multi-agent Agri-food living labs for new supply chain Mediterranean systems; towards more sustainable and competitive farming addressing consumers' preferences and market changes

Context

LAB4SUPPLY aims to provide a practical solution that addresses the current difficulties of Mediterranean smallholders and traditional farmers, who face the main challenges in the existing Agri-food value chain. An analysis is needed to fully understand the Agri-food supply chains studied, including all the variables and agents, making them accessible to smallholders by providing alternatives that optimize their decisions. It is expected that by having all the information available, smallholders and other involved stakeholders will be able to make informed decisions improving their overall competitiveness. Furthermore, an analysis is required to bridge local small-scale Agri-food manufacturers, including farmers, and alternative food added-value ecosystems. There are only partial studies analyzing single stages or single dimensions of the Mediterranean supply chain. However, there is no multidimensional framework to evaluate aggregated supply chains in the Mediterranean context. The project contributes to developing a sustainable supply chain impact framework and establishing how to analyze different supply chains from farm to fork, including multiple indicators (economic, social and environmental), defining a sustainable index, always considering local stakeholders' perspectives with a bottom-up approach.

Objective and contents

LAB4SUPPLY's primary goal is to empower agri-food smallholders in the Mediterranean agricultural systems by defining, enhancing, and transferring competitive and efficient food supply chain alternatives that address farmer's capacities, consumer needs and unexpected market changes. The project proposes to design and develop a multidimensional framework applied to five essential selected products' (Figs, Tomato, Carob, Goat, and Chestnut) in Spain, Algeria, France and Morocco that integrates economic, social, and environmental indicators with a bottom-up approach considering the stakeholders' perspectives. The project proposes a participatory approach based on creating an Agri-food Innovation Ecosystem (AIE) Living-Lab (LL) that will be the arena to collect information from the food sector and consumers and transfer and apply it to new optimized business models.

Other Entities/ 8

Université de Tizi-Ouzou, Faculté des Sciences Biologiques et des Sciences Agronomiques Algeria
Scientific Officer: DJENANE, Djamel

Ecole Nationale Supérieure Agronomique, Algeria
Scientific Officer: KACI, Ahcène

Smartec Systems, Egypt
Scientific Officer: KHATTAB, Ahmed

Mediterranean Agronomic Institute of Montpellier, International Centre for Advanced Mediterranean Agronomic Studies, France
Scientific Officer: LE GRUSSE, Philippe

Agricultural University of Athens, Greece
Scientific Officer: DRICHOUTIS, Andreas

HORTA srl, Italy
Scientific Officer:
MANSTRETTA, Valentina

Institut National de la Recherche Agronomique, Morocco
Scientific Officer: NOUTFIA, Younes

Sultan Moulay Slimane University, Morocco
Scientific Officer: OUABOUCH, Hassan

This approach will be unfolded by the joint creation of two levels of interaction: a face-to-face one through the creation of an Agri-food Stakeholders Platform (ASP) and a "digital" one through a Decision Support System (DSS) ICT tool to amplify the "scope" of the project. An Open Innovation Approach based on an AIE is presented as an appropriate vehicle to support and reach LAB4SUPPLY objectives, constituted by a community of practitioners where the stakeholders will cooperate in an open space to analyze the barriers and opportunities jointly develop innovative ideas.

Expected impact and results

The design of a supply chain aggregated multidimensional analysis framework at the Mediterranean level by the generation of an innovative living-lab ecosystem (the Agri-food Stakeholders Platform) is expected to answer current barriers and limitations of Mediterranean smallholders, involving different small-scale stakeholders of the traditional added-value food chain. The creation of a DSS ICT tool based on all the information generated and gathered in a channels model simulator for each of the selected chains during the Living Lab will provide local small-scale farmers with information (easily and intuitively) on new markets and chain alternative opportunities, for a better decision making. The Agrifood Innovation Ecosystem living-lab will be the arena to test and validate the tool available for - key selected products - smallholders once the project finishes. Through the DSS ICT tool designed, smallholders and/or entrepreneurs may explore several commercialization alternatives and verify the diversification of the production costs and sales risk and maximize their potential benefits. The Agri-food Stakeholders Platform is expected to provide smallholders with helpful information and connections to access new markets, training, business networking and eco-friendly production systems. The platform will coordinate the Mediterranean supply chains to ensure fair profit to smallholders and sustainable farming.

Agrifood Innovation Ecosystem Living Lab

Thematic Area

Agro-food Value Chain

Section II

Topic - New optimization models of the agro food supply chain system to fair price for consumers and reasonable profit share for farmers

Action

RIA - Research & Innovation Action

Budget

1.082.267 €

Duration

36 months

State and Coordinator Entity

ITALY

Università di Bologna,
Dipartimento di Scienze e Tecnologie Agro-Alimentari

ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA

Scientific Officer:
CAMANZI, Luca

Participating States/ 5

Research Units/ 11

Section II

28. MED-LINKS

Data-Enabled Business Models and Market Linkages Enhancing Value Creation and Distribution in Mediterranean Fruit and Vegetable Supply Chains

Context

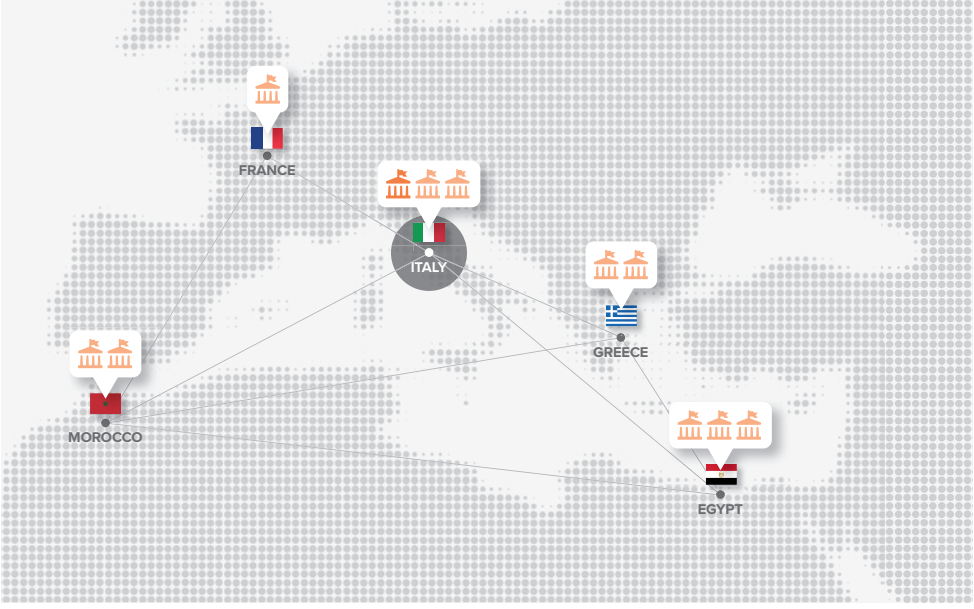
MED-LINKS consortium includes eleven partners from five countries. MED-LINKS Consortium partners have been selected based on their scientific excellence in various disciplines, including agronomy, agricultural economics, consumer studies, engineering, information technology, management, food safety, and sustainable development, as well as based on their networking capacity and their experience in other international research projects.
MED-LINKS Consortium will develop innovative and theme-specific operational methodologies for participative Pilot Actions to demonstrate, test, and evaluate innovative IT and management solutions for FV value chains in the Mediterranean region. Sustainability certification schemes such as PGS will also encourage the active participation of relevant stakeholders based on networks and knowledge exchange. These certifications boost the direct involvement of producers and consumers who can give feedback and state preferences on specific products' attributes. Producer associations, consultants, and experts of the field are also actively involved in the first selection and evaluation of certifications and business strategies and the operational activities of the pilot actions together with farmers and consumers.

Objective and contents

MED-LINKS aims to provide small-scale producers with tailored and practical solutions to enhance efficiency, sustainability, and fairness in Mediterranean countries along fruit and vegetable supply chains. MED-LINKS approach is based on the combination of three groups of optimisation tools:

1. Quality and sustainability standards and protocols;
2. Digital platform empowered with blockchain technology (smart contracts);
3. Managerial tools and coordination strategies (i.e., Business Models).

These will be customised based on the actual conditions of local actors participating in three different supply chain systems representative of commercial circuits in the Mediterranean region, namely: a) local Short Food Supply Chains, b) Green Public Procurement, c) Export-Oriented Supply Chains.



Other Entities/ 10

Romagna Tech scpa, Italy
Scientific Officer: FANTINI, Massimiliano

Università degli Studi di Cassino e del Lazio Meridionale, Dipartimento di Economia e Giurisprudenza, Italy
Scientific Officer: DE ROSA, Marcello

Heliopolis University for Sustainable Development, Egypt
Scientific Officer: FAYEZ HINDAWY, Saber

ISIS for Food Industries LTD, Egypt
Scientific Officer: VON LAUE, Sigward

Sekem Development Foundation, Egypt
Scientific Officer: ELDAHAN, Omar

Centre International de Hautes Études Agronomiques Méditerranéennes – Institut Agronomique Mediterranéen de Montpellier, CIHEAM-IAMM, France
Scientific Officer: PROSPERI, Paolo

Aristotle University of Thessaloniki, Greece
Scientific Officer: MICHAILIDIS, Anastasios

International Hellenic University, Greece
Scientific Officer: AIDONIS, Dimitrios

University of Cadi Ayyad, Morocco
Scientific Officer: OUAHI, Lhoucine

University of Moulay Ismail, Morocco
Scientific Officer: AIT HOU, Mohamed

The project will target and engage local clusters of small-scale producers in Egypt, France, Greece, Italy, and Morocco to enhance their capability to adopt quality, environmental and social standards and thus to connect with other supply chain actors and profitability while meeting final consumers' needs.

Expected impact and results

MED-LINKS was conceived to improve the business environment of Mediterranean FV supply chains. The successful implementation of the project will be measured against a series of Key Performance Indicators (KPIs), inclusive of the supply chain network, which will identify potential hotspots and provide a mechanism for assessment and control.
EI 1 - New technology tools and business models for market access, suited to local clusters and SMEs, and new generations of young entrepreneurs.
EI 2 - New insights into the competitiveness of local clusters with innovative integrated planning and institutional solutions for sustainability and profitability.
EI 3 - New IT solutions to increase the added value of products from local clusters to lower the transaction costs and increase the competitiveness of the supply chains under evaluation.
EI 4 - Transparencies in fair trade and shortening Agri-food chain beneficial for smallholders. The project will realise a survey on Supply Chains' competitive and value distribution performances.
EI 5: Verified consumer feedback on quality and safety of products from smallholders, locally produced or obtained in inter Mediterranean country trade.

Thematic Area

Agro-food Value Chain

Section II

Topic - New optimization models of the agro food supply chain system to fair price for consumers and reasonable profit share for farmers

Action

RIA - Research & Innovation Action

Budget

589.800 €

Duration

36 months

State and Coordinator Entity

SPAIN

Instituto Andaluz de Investigación y Formación Agraria, Pesquera, Alimentaria y de la Producción Ecológica

Junta de Andalucía
Consejería de Agricultura, Ganadería, Pesca y Desarrollo Sostenible
INSTITUTO DE INVESTIGACIÓN Y FORMACIÓN AGRARIA Y PESQUERA

Scientific Officer:
BELTRAN, Gabriel

Participating States/ 4

Research Units/ 5

Section II

29. OIL4MED

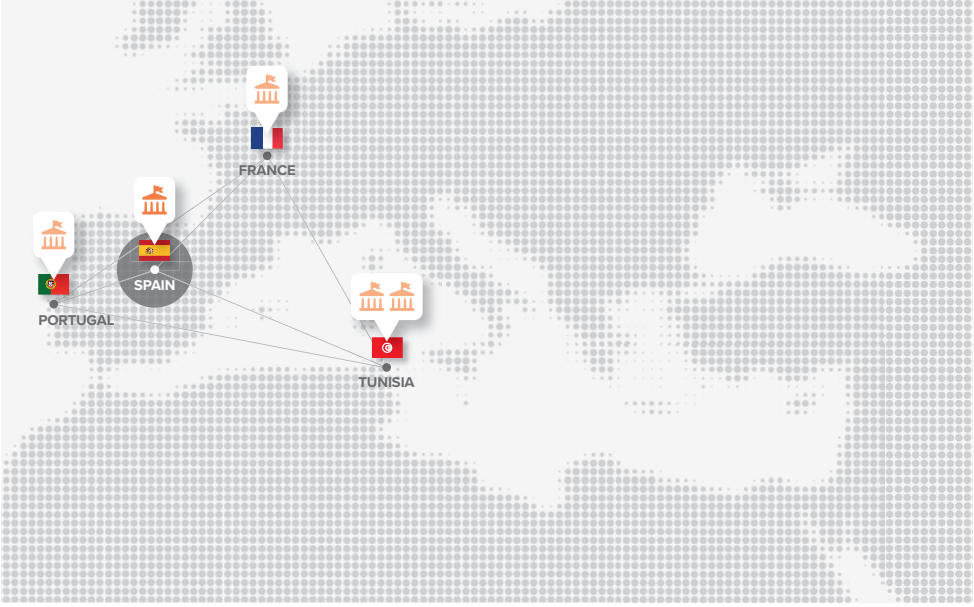
Open platform and falrness olive oil suppLy chain for MEDiterranean small farmers

Context

Olive products are among the most famous Mediterranean ingredients and foods. Olive oil is a strategic product for both the local and national market for all countries. It is considered the most dynamic of the Mediterranean agri-food system and is a critical engine of the economies of various countries. Global olive oil market size is expected to grow by approximately 525 KMT during the period 2020-2041, which is expected to post a CAGR (compound annual growth rate) of 3.04%.
However, small farms are characterized by high production costs and low profit levels. The presence of large companies and agri-food import / export intermediaries reduces the negotiation capacity of small farmers and limits their capacity. Unfair competition has resulted in a high profit for various intermediate players at the expense of small farmers. Furthermore, the food industry chain suffers from a serious lack of transparency and competitiveness and multiple countries raise questions about the traceability, origin and quality of olive oil as acceptance criteria.
The challenges will be to ensure full market access and to reduce the gap between the actual selling price to the consumer and the resellers' purchase price (producer price). Therefore, OIL4MED will protect and display all information relating to the key players in the olive supply chain, from the grower to the consumer (from farm to table) to processors and distributors. Another challenge is responding to the growing consumer demand for organic and high quality products. World market demand is growing for high quality and certified organic olive oils. Furthermore, the market increasingly asks for the implementation of procedures for compliance with the relevant regulations and the origin of the oil, indicating the Denomination of Controlled Origin and the Denomination of Controlled Origin.

Objective and contents

The primary purpose of OIL4MED is to assist small farms through an intelligent collaborative platform using innovative technologies and tailored business models (sale before cultivation, direct sale to consumers, collective sale, export) to improve profitability and ensure trust and transparency to commercialize their products



Other Entities/ 4

Télécom SudParis, France
Scientific Officer: LAOUITI, Anis

Universidade de Lisboa, Instituto Superior de Agronomia, Portugal
Scientific Officer: RIBEIRO, Henrique

Institut de l'Olivier, Tunisia
Scientific Officer:
AYACHI MEZGHANI, Mouna

University of Sousse, Tunisia
Scientific Officer: BRAHAM, Mohamed

efficiently and cost-effectively. These disruptive technologies will guarantee olive oil quality and safety from a supply chain management perspective. The critical issue is building a decentralized information system for the whole food supply chain. By using ICT-based solutions (IoT, Blockchain, cloud-based platform), this new decentralized information system will be a disruptive innovation that will provide a shared knowledge platform for all supply chain members (including government departments and third-party regulators) based on fairness, openness, transparency, neutrality, reliability and security. OIL4MED will establish an olive oil supply chain traceability system for real-time oil tracing. It will also build a safety control system by integrating data with general supply chain risk management methods and significantly improving the performance of small farmers.

Expected impact and results

OIL4MED is a highly impact-driven project that can revolutionize the Mediterranean agri-food supply chain. The project will accelerate and de-risk the development and adoption of an open AI-based robotics platform that streamlines co-creative solutions' optimal design and integration. The developed web-based applications will accelerate the building of communities and facilitate access to a transparent market. The equitable business model will encourage young millennials to invest in the olive value chain. The quality assurance and synergies building will empower the impacts of small farmers and consumers on the olive-based supply chain. These neglected stakeholders will be engaged and have an active role in this ecosystem. The implementation of smart contracts will guarantee the benefits of small and disadvantaged actors. The synergies between researchers, farmers and industries, and access to meaningful knowledge will allow the development of new uses and applications of olive oil (cosmetis, traditional medicine, para-pharmaceutics) and valorize the by-products. Moreover, OIL4MED will raise the health-conscious population. Blockchain technology will bring more transparency, efficiency and reduce intermediaries. The decision support systems will allow optimizing the olive chain by identifying nearest collaborators and avoid monopoly. The platform will facilitate the gathering of consumers' feedback and evaluations to ensure a continuous improvement process. OIL4MED will provide tailored products and services while considering the different categories of customers and consumption behaviours. OIL4MED will ultimately enhance Mediterranean technical capacity and competitiveness, creating new market opportunities for producers and catalyzing their economic growth, leading to socially significant impacts (jobs creation and retention). OIL4MED will deliver further social and environmental benefits elaborated in this section.

Thematic Area

Agro-food Value Chain

Section II

Topic - New optimization models of the agro food supply chain system to fair price for consumers and reasonable profit share for farmers

Action

RIA - Research & Innovation Action

Budget

888.826 €

Duration

36 months

State and Coordinator Entity

ITALY

Università degli Studi di Milano, Dipartimento di Medicina Veterinaria

UNIVERSITÀ DEGLI STUDI DI MILANO

Scientific Officer:
BRECCHIA, Gabriele

Participating States/ 4

Research Units/ 10

Section II

30. ORABBIT

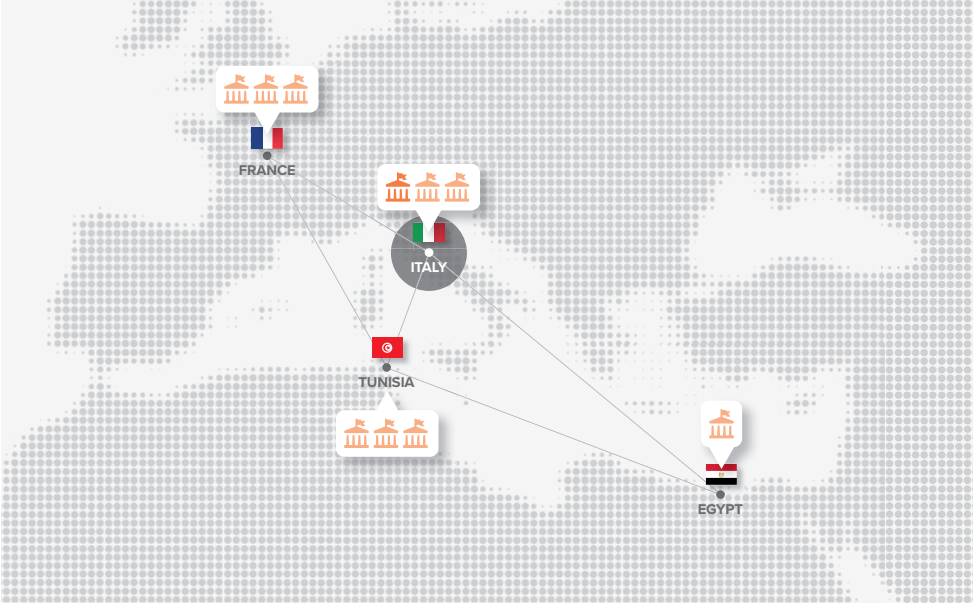
Omega RABbit: food for health BenefIT

Context

The ratio of omega 6 and 3 fatty acids in the human diet is considered regular about 4/1. In Western countries, the diet is unbalanced, as this ratio ranges from 15-20/1, contributing to increased incidence of cardiovascular diseases, obesity, diabetes, and reducing fertility, especially male fertility. Considering these data, a strategy that could reduce this ratio is introducing the human diet of products with a high content of n-3. In this context, integrating the animal diet with flax and/or algae products with a high content of α-linolenic acid essential precursor of n-3 can improve the reproductive and productive performance, the quality of the meat, and welfare and the sanitary status of the rabbit. Consequently, the production and consumption of innovative functional food, Ωrabbit rabbit meat, and having a positive impact on health, can lead to an improvement in the nutritional and socio-economic conditions of the populations of the Mediterranean area.

Objective and contents

The project has the following aims: 1. to develop specific feeds for reproducing and growing rabbits based on the supplementation of linen derived products and algae, to reach a higher n-3 fatty acids content in meat, and to assess the role of "n-3 fixation booster"; 2. to increase the fertility of rabbits to make more efficient the rabbit farming systems, including in hot climatic conditions also related to "global warming"; 3. to improve the sanitary status in the rabbit farms through a higher resistance to infectious diseases, by increasing the immunological response of the animals and thus leading to reduce the use of antibiotics and to improve the animal welfare; 4. to produce a new innovative, high quality and functional food (Ωrabbit meat) that can be produced by SMEs and can link local agricultural producers to urban, national, and international markets; 5. to develop an innovative method of packaging that allows to maintain the quality of Ω rabbit meat and to prolong its shelf-life contributing to its commercialization in the domestic market and also for export (to reverse the import trend in the agricultural sector in some Mediterranean countries); 6. to create a new market and supply food chain (ΩRABBIT Consortium) that includes under its discipli-



Other Entities/ 9

Università degli Studi di Perugia, Dipartimento di Scienze Agrarie, Alimentari ed Ambientali, Italy
Scientific Officer:
DAL BOSCO, Alessandro

Consiglio per la Ricerca in Agricoltura e l'Analisi dell'Economia Agraria (CREA), Centro di Zootecnia e Acquacoltura, Italy
Scientific Officer: FAILLA, Sebastiana

Animal Production Research, Egypt
Scientific Officer: ABDEL-KAFY, EL-Sayed Mahfouz

Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement (INRAE), Occitanie-Toulouse Centre, France
Scientific Officer: GIDENNE, Thierry

Valorex SAS, France
Scientific Officer: MATHIEU, Guillevic

Copri SARL, France
Scientific Officer: COLIN, Michel

Groupement Interprofessionnel des Produits Avicoles et Cunicoles (GIPAC), Tunisia
Scientific Officer: DABBOUSSI, Imen

Carthage University, Higher School of Agriculture of Mateur, Tunisia
Scientific Officer: JEMMALI, Bayrem

Ecole Nationale de Médecine Vétérinaire, Tunisia
Scientific Officer:
BEN SALEM, Imene

nary and logo, farmers, breeders and research centres that produce Ωrabbit meat as a guarantee of a high quality product and under the principle "from the farm to the fork".

Expected impact and results

The project plans to create new types of feed for rabbits, integrated with products derived from flax and algae, rich in n-3, capable of improving reproductive and productive performance, resistance to infection (reduction of the use of antibiotics) and animal welfare. New packaging models will also be developed to maintain the quality of the meat unchanged and extend its shelf-life, favouring its marketing. Finally, the Project plans to create a new functional food enriched in n-3 (Ωrabbit meat) capable of improving human health, produced within a new model of the agri-food chain in the Mediterranean area. Dissemination of the results can contribute to the launch of this new functional product in the European and world market. The production of Ωrabbit meat can positively impact the local market, exports, and knowledge-based work. The consumption of Ωrabbit can increase the protein intake in some areas and help balance the n-6/n-3 ratio of the diet in other countries, with beneficial effects on human health. The consortium can give the supply chain the ability to compete with non-EU rabbit producers and, at the same time, guarantees high product quality standards and traceability to the consumer.

SPECIFIC OBJECTIVES

- to develop feed based on the integration of products derived from flax and algae capable of promoting the productive and reproductive performance of the rabbit;
- to improve the sanitary conditions of rabbit farms through a better immunological response and more excellent resistance to infectious diseases, thus leading to a reduction in the use of antibiotics;
- to produce a new and innovative functional food (Ωrabbit meat);
- to develop an innovative packaging method, which allows to maintain the quality and extend the shelf-life of Ωrabbit meat;
- to create a new market and a new food chain (Consortium ΩRABBIT).

Ωrabbit meat

Thematic Area

Agro-food Value Chain

Section II

Topic - New optimization models of the agro food supply chain system to fair price for consumers and reasonable profit share for farmers

Action

RIA - Research & Innovation Action

Budget

787.000 €

Duration

36 months

State and Coordinator Entity

SPAIN

Universidad de Santiago de Compostela

Scientific Officer:
SENDON, Raquel

Participating States/ 5

Research Units/ 8

Section II

31. VallCET

Valorise foods and Improve Competitiveness through Emerging Technologies applied to food by-products within the circular economy framework

Context

The Mediterranean Basin is an agroecological diversity hotspot with an extraordinary variety of raw materials that allow the agri-food industry to offer many traditional food products. However, this industry is responsible for severe environmental problems related to the production of large amounts of wastes along the agri-food chain, whose disposal represents a critical hurdle to sustainability, affecting negatively economic, environmental, and social development. The Mediterranean Agri-food value chain, involving several local actors, such as farmers, small-scale food manufacturers, and local distributors, among others, is challenged by the dual objective of (i) enhancing competitiveness, which is currently challenged by non-optimized organizational model, extended supply chain and imported low price products of global markets, and (ii) improving the sustainability of the productions and increase the shelf-life, safety, quality and nutritional value of food products. Thus, in agreement with Goals 2 and 12 of Agenda 2030 to ensure "Zero hunger" and "Sustainable consumption and production patterns", respectively, it is highly recommended that all the stakeholders of the agri-food supply chain, including the agro-industrial and scientific communities, work together to set up innovative technological and organizational strategies to (i) optimize agri-food chain models to reduce post-farming losses and the environmental impact of the production processes; (ii) implement the circular economy concept along with responsible production and consumption concepts, and (iii) increase productivity of high-quality food products with beneficial health properties with a fair price for consumers while enabling reasonable profit for producers.

Objective and contents

VallCET will focus on the development of novel strategies for the valorisation of wastes and by-products from post-farming processes of Mediterranean agri-food systems and the design of eco-friendly methods (Pulsed electric fields, PEF; High-pressure homogenization, HPH; supercritical waster extraction, SWE) to recover high-added-value bio-actives from being reintroduced in the agri-food chain as food ingredients/additives within the circular economy framework.

Other Entities/ 7

Université de Bordeaux, France
Scientific Officer: GHIDOSSI, Rémy

ProdAl scarl, Italy
Scientific Officer: PATARO, Gianpiero

F.lli Santorelli sas, Italy
Scientific Officer: VETRANO, Elena

CTI FoodTech srl, Italy
Scientific Officer: CRESCENZO, Biagio

INIAV - Instituto Nacional de Investigação Agrária e Veterinária IP, Portugal
Scientific Officer: SANCHES SILVA, Ana

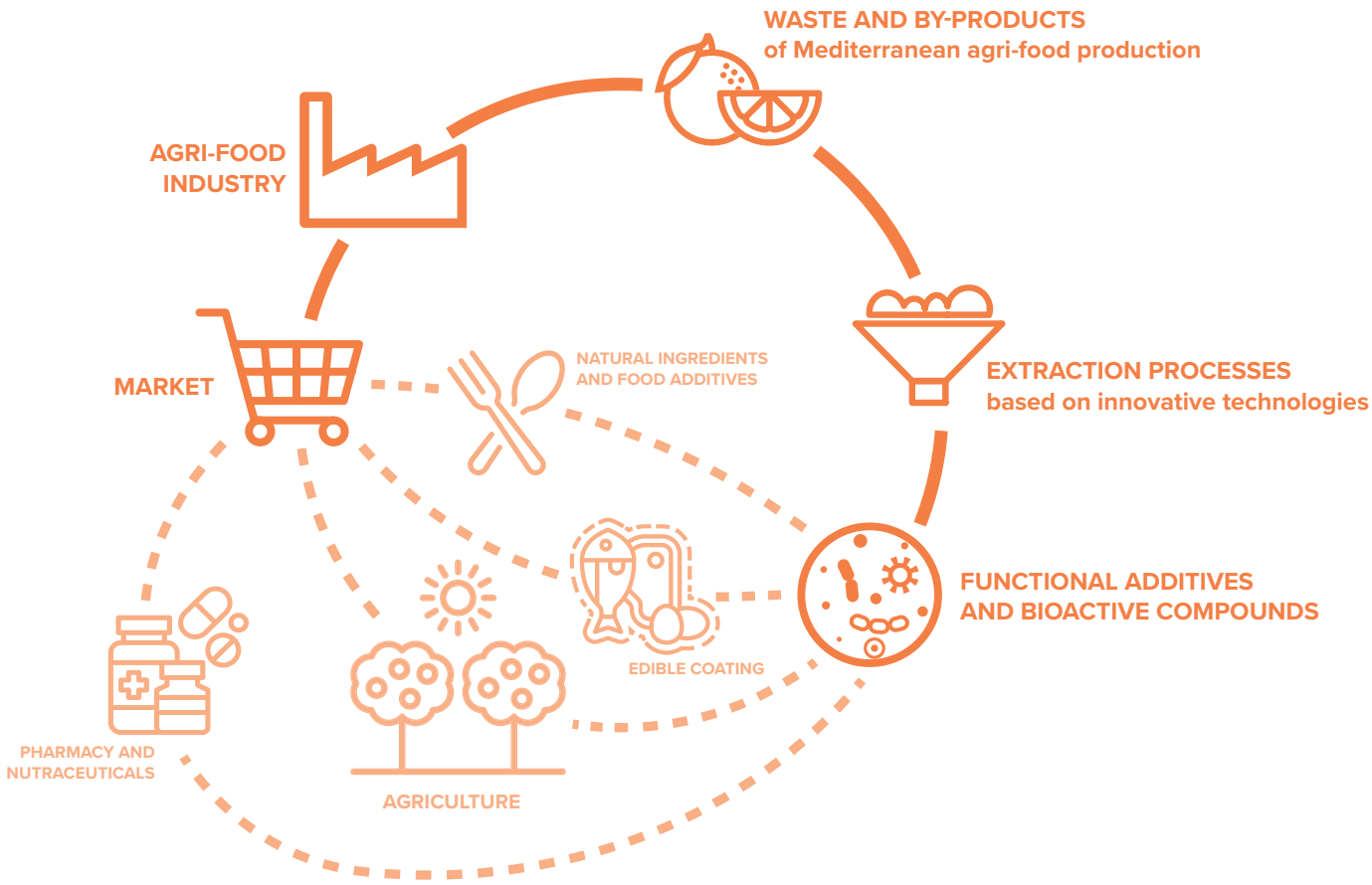
Institut National de Recherche et d'Analyse Physico-chimique, Tunisia
Scientific Officer: KHWALDIA, Khaoula

Graines et Saveurs, Tunisia
Scientific Officer: KORAICHI, Rania

The valorization of these by-products into the food value chains will increase consumers' demand for functional and healthier foods with clean labels at a fair price and locally produced. The active ingredients/additives with high nutritional value and antioxidant and antimicrobial activities can reduce post-farming food losses during transportation and storage, improve the nutritional and sensory quality, and extend the shelf-life of Mediterranean food products such as fruits, bakery, wine, and dairy products. ValICET will deploy an ICT solution and develop innovative processing technologies and business models that will improve the competitiveness of local actors of the agri-food supply chain by ensuring stakeholders (farmers, equipment manufactures processors, local retailers, and consumers) engagement and shorter supply chain and, especially, meeting consumer demands for healthier and locally produced foods, thus providing economic, environmental and social benefits to smallholders.

Expected impact and results

ValICET will use an innovative approach to hypothesize solutions, leading to the maximal exploitation of food wastes and food by-products potentialities through their conversion into value-added foods for human consumption. The implementation of innovative and sustainable processes to produce added-value products from local food manufacturers while delivering marketing strategies and business models will contribute to (i) optimize the local Agri-food supply chain production (ii) decrease the negative impact of food waste and by-products in the environment, (iii) reduce food losses during storage and transportation, (iv) improve sociological understanding (particularly consumer perception), and (v) enhance the competitiveness of local cluster by identification of new production and market opportunities with consequently increased profit for the companies of the entire chain.
The implementation of the ICT tool will contribute to improve and facilitate communication and transparency among the involved actors and share the knowledge, build local short Agri-food supply chains for the future commercialization and distribution of added-value products, create a local and international network among different food industries, and enhance inter-Mediterranean country trade to guarantee higher profitability and competitiveness for local actors of the agri-food chain.



Overview 2018-2020

Overview 2018-2020

129 Funded Projects

7,4% SUCCESS RATE

1733 Proposals submitted

of which

Projects per nationality of coordinating Entities

43 | 37 | 10
14 | 12 | 6
3 | 1 | 1
1 | 1

31 | 58 | 35 | 5

Projects per Thematic Area

19 Participating States

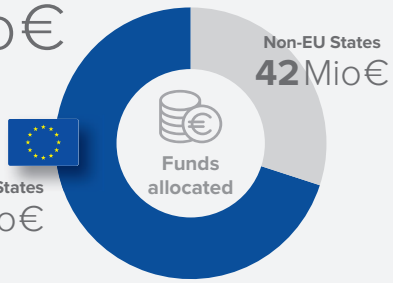
of which

11 EU States

8 Non-EU States

164,5 Mio€ Budget

UE+Participating States



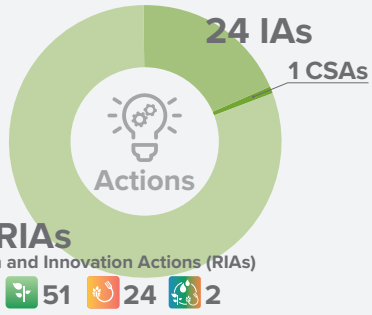
Actions

Innovation Actions (IAs)

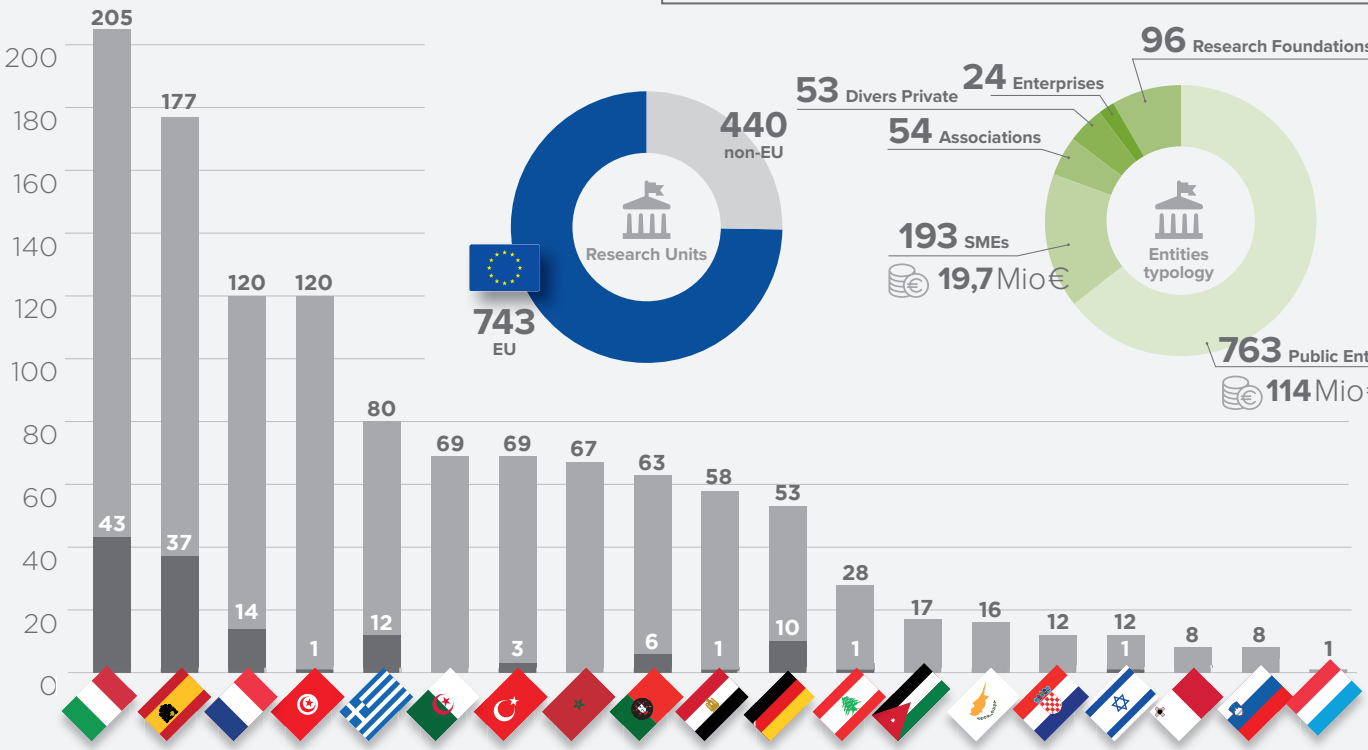
4 | 7 | 11 | 2

Coordination and Support A. (CSAs)

1



1183 Research Units



Research Units per nationality

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Colle di Val d'Elsa (Siena) - Italy
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PRIMA
PARTNERSHIP FOR RESEARCH AND INNOVATION
IN THE MEDITERRANEAN AREA

Funded Projects 2020

PRIMA Foundation

Carrer del Gran Capitá, 2-4
Nexus 1 Building, 3rd floor
Barcelona

http://prima-med.org

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