

## Horizon 2020

**Call: H2020-SC5-2016-2017**  
(Greening the Economy)

**Topic: SC5-01-2016-2017**

**Type of action: RIA**  
(Research and Innovation action)

**Proposal number: 776467**

**Proposal acronym: MED-GOLD**

**Deadline Id: H2020-SC5-2017-OneStageB**  
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### How to fill in the forms

The administrative forms must be filled in for each proposal using the templates available in the submission system. Some data fields in the administrative forms are pre-filled based on the previous steps in the submission wizard.



Proposal ID **776467**

Acronym **MED-GOLD**

## 1 - General information

Topic SC5-01-2016-2017

Call Identifier H2020-SC5-2016-2017

Type of Action RIA

Deadline Id H2020-SC5-2017-OneStageB

Acronym MED-GOLD

Proposal title\*

Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems

*Note that for technical reasons, the following characters are not accepted in the Proposal Title and will be removed: < > " &*

Duration in months 48

Fixed keyword 1

*Climatology and climate change*

Add

Fixed keyword 2

*Earth Observation / Services and applications*

Add

Remove

Fixed keyword 3

*Business model innovation*

Add

Remove

Free keywords

*Climate services; agricultural sector; olives oil; wine; pasta; olives; grape, durum wheat;*



Proposal ID **776467**

Acronym **MED-GOLD**

### Abstract

*MED-GOLD will demonstrate the proof-of-concept for climate services in the agriculture sector by developing case studies for three hallmarks of the Mediterranean food system: grapes, olives and durum wheat. Agriculture is primarily climate-driven and hence highly vulnerable to climate variability and change. Evidence suggests that the Mediterranean region is under immediate threat of shifting climate patterns and the associated ecological, economic and social effects. Developing a capacity to turn the increasingly big climate-related data into tailored climate services that can inform decision-making in agriculture, is therefore a priority both in Europe and worldwide. The long-term goal of this project is to make European agriculture and food systems more competitive, resilient, and efficient in the face of climate change, by using climate services to minimize climate-driven risks/costs and seize opportunities for added-value.*

*The MED-GOLD project aims to develop climate services for olive, grape, and durum wheat crop systems that are the basis for producing olive oil, wine and pasta. This set of crops and related food products is of utmost climatic, ecological, economic, and cultural relevance to the Mediterranean region. Because olive oil, wine and pasta are not only hallmarks of the Mediterranean diet but also food commodities with a global market, there is considerable potential for developing climate services with high added-value for olive, grape, and durum wheat. A key challenge is to co-design prototype pilot service applications involving both suppliers and users in the three major traditional Mediterranean crop systems so as to demonstrate the added-value of data/information-driven responses to changes in the climate system. The operational decision-making of users will be reviewed to either identify key decisions or introduce new actions that can benefit from climate-related information at different timescales from months to decades.*

Remaining characters

17

Has this proposal (or a very similar one) been submitted in the past 2 years in response to a call for proposals under Horizon 2020 or any other EU programme(s)?

☐ Yes ☒ No



Proposal ID **776467**

Acronym **MED-GOLD**

### Declarations

1) The coordinator declares to have the explicit consent of all applicants on their participation and on the content of this proposal.	<input checked="" type="checkbox"/>
2) The information contained in this proposal is correct and complete.	<input checked="" type="checkbox"/>
3) This proposal complies with ethical principles (including the highest standards of research integrity — as set out, for instance, in the <a href="#">European Code of Conduct for Research Integrity</a> — and including, in particular, avoiding fabrication, falsification, plagiarism or other research misconduct).	<input checked="" type="checkbox"/>
4) The coordinator confirms:	
- to have carried out the self-check of the financial capacity of the organisation on <a href="http://ec.europa.eu/research/participants/portal/desktop/en/organisations/lfv.html">http://ec.europa.eu/research/participants/portal/desktop/en/organisations/lfv.html</a> or to be covered by a financial viability check in an EU project for the last closed financial year. Where the result was “weak” or “insufficient”, the coordinator confirms being aware of the measures that may be imposed in accordance with the H2020 Grants Manual (Chapter on Financial capacity check); or	<input type="radio"/>
- is exempt from the financial capacity check being a public body including international organisations, higher or secondary education establishment or a legal entity, whose viability is guaranteed by a Member State or associated country, as defined in the H2020 Grants Manual (Chapter on Financial capacity check); or	<input checked="" type="radio"/>
- as sole participant in the proposal is exempt from the financial capacity check.	<input type="radio"/>
5) The coordinator hereby declares that each applicant has confirmed:	
- they are fully eligible in accordance with the criteria set out in the specific call for proposals; and	<input checked="" type="checkbox"/>
- they have the financial and operational capacity to carry out the proposed action.	<input checked="" type="checkbox"/>
The coordinator is only responsible for the correctness of the information relating to his/her own organisation. Each applicant remains responsible for the correctness of the information related to him/her and declared above. Where the proposal to be retained for EU funding, the coordinator and each beneficiary applicant will be required to present a formal declaration in this respect.	

According to Article 131 of the Financial Regulation of 25 October 2012 on the financial rules applicable to the general budget of the Union (Official Journal L 298 of 26.10.2012, p. 1) and Article 145 of its Rules of Application (Official Journal L 362, 31.12.2012, p.1) applicants found guilty of misrepresentation may be subject to administrative and financial penalties under certain conditions.

#### Personal data protection

The assessment of your grant application will involve the collection and processing of personal data (such as your name, address and CV), which will be performed pursuant to Regulation (EC) No 45/2001 on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data. Unless indicated otherwise, your replies to the questions in this form and any personal data requested are required to assess your grant application in accordance with the specifications of the call for proposals and will be processed solely for that purpose. Details concerning the purposes and means of the processing of your personal data as well as information on how to exercise your rights are available in the [privacy statement](#). Applicants may lodge a complaint about the processing of their personal data with the European Data Protection Supervisor at any time.

Your personal data may be registered in the Early Detection and Exclusion system of the European Commission (EDES), the new system established by the Commission to reinforce the protection of the Union's financial interests and to ensure sound financial management, in accordance with the provisions of articles 105a and 108 of the revised EU Financial Regulation (FR) (Regulation (EU, EURATOM) 2015/1929 of the European Parliament and of the Council of 28 October 2015 amending Regulation (EU, EURATOM) No 966/2012) and articles 143 - 144 of the corresponding Rules of Application (RAP) (COMMISSION DELEGATED REGULATION (EU) 2015/2462 of 30 October 2015 amending Delegated Regulation (EU) No 1268/2012) for more information see the [Privacy statement for the EDES Database](#).





Proposal ID **776467**

Acronym **MED-GOLD**

## List of participants

#	Participant Legal Name	Country
1	AGENZIA NAZIONALE PER LE NUOVE TECNOLOGIE, L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE	Italy
2	BARILLA G. E R. FRATELLI SPA	Italy
3	BEETOBIT SRL	Italy
4	BARCELONA SUPERCOMPUTING CENTER - CENTRO NACIONAL DE SUPERCOMPUTACION	Spain
5	CONSIGLIO NAZIONALE DELLE RICERCHE	Italy
6	DCOOP SOCIEDAD COOPERATIVA ANDALUZA	Spain
7	AGC Market View Services	Spain
8	GMV AEROSPACE AND DEFENCE SA	Spain
9	HORTA SRL	Italy
10	JRC -JOINT RESEARCH CENTRE- EUROPEAN COMMISSION	Belgium
11	MET OFFICE	United Kingdom
12	NATIONAL OBSERVATORY OF ATHENS	Greece
13	SOGRAPE VINHOS S.A.	Portugal
14	Universidad Militar Nueva Granada	Colombia
15	UNIVERSITY OF LEEDS	United Kingdom
16	PANEPISTIMIO THESSALIAS	Greece

Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **ENEA**

## 2 - Administrative data of participating organisations

### PIC

999988521

### Legal name

AGENZIA NAZIONALE PER LE NUOVE TECNOLOGIE, L'ENERGIA E LO SVILUPPO ECONOMICO

Short name: *ENEA*

### Address of the organisation

Street Lungotevere Grande Ammiraglio Thaon di Reve

Town ROMA

Postcode 00196

Country Italy

Webpage <http://www.enea.it>

### Legal Status of your organisation

#### Research and Innovation legal statuses

Public body .....yes

Legal person ..... yes

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....yes

#### Enterprise Data

SME self-declared status ..... 03/09/2003 - no

SME self-assessment ..... unknown

SME validation sme..... 03/09/2003 - no

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **ENEA**

### Department(s) carrying out the proposed work

#### Department 1

Department name SSPT- Department for Sustainability

☐ not applicable

☒ Same as organisation address

Street Lungotevere Grande Ammiraglio Thaon di R

Town ROMA

Postcode 00196

Country Italy

### Dependencies with other proposal participants

Character of dependence	Participant	
-------------------------	-------------	--

Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **ENEA**

### Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title

Dr.

Sex

☒ Male

☐ Female

First name **Alessandro**

Last name **DELL'AQUILA**

E-Mail **alessandro.dellaquila@enea.it**

Position in org.

Researcher

Department

Department for Sustainability

☐ Same as organisation

☐ Same as organisation address

Street

CR Casaccia, Via Anguillarese 301

Town

Rome

Post code

00123

Country

Italy

Website

<http://utmea.enea.it/people/dellaquila/index.php>

Phone 1

+390630486870

Phone 2

+XXX XXXXXXXXXX

Fax

+XXX XXXXXXXXXX

### Other contact persons

First Name	Last Name	E-mail	Phone
Luigi	Ponti	luigi.ponti@enea.it	
Sandro	Calmanti	sandro.calmanti@enea.it	
Franco	Carvisiglia	franco.carvisiglia@enea.it	

Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **BARILLA G. E R. FRATELLI SPA**

**PIC**

958880406

**Legal name**

BARILLA G. E R. FRATELLI SPA

Short name: *BARILLA G. E R. FRATELLI SPA*

Address of the organisation

Street VIA MANTOVA 166

Town PARMA

Postcode 43122

Country Italy

Webpage

Legal Status of your organisation

### Research and Innovation legal statuses

Public body .....no

Legal person ..... yes

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

### Enterprise Data

SME self-declared status ..... unknown

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name

**BARILLA G. E R. FRATELLI SPA**

### Department(s) carrying out the proposed work

#### Department 1

Department name

Strategic Commodities Market Intelligence - Central Purchasing

☐ not applicable

☒ Same as organisation address

Street

VIA MANTOVA 166

Town

PARMA

Postcode

43122

Country

Italy

### Dependencies with other proposal participants

Character of dependence	Participant	
-------------------------	-------------	--

Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **BARILLA G. E R. FRATELLI SPA**

### Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title

Dr.

Sex

☐ Male

☒ Female

First name **Chiara**

Last name **Monotti**

E-Mail **chiara.monotti@barilla.com**

Position in org. Strategic Commodities Market Intelligence Senior Manager

Department BARILLA G. E R. FRATELLI SPA

☒ Same as organisation

☒ Same as organisation address

Street VIA MANTOVA 166

Town PARMA

Post code 43122

Country Italy

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Phone 1

Phone 2

+XXX XXXXXXXXXX

Fax

+XXX XXXXXXXXXX

### Other contact persons

First Name	Last Name	E-mail	Phone
Cesare	Ronchi	cesare.ronchi@barilla.com	
Marco	Silvestri	marco.silvestri@barilla.com	



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **BEETOBIT SRL**

**PIC**

915371735

**Legal name**

BEETOBIT SRL

Short name: *BEETOBIT SRL*

Address of the organisation

Street via Sidney Sonnino, 32

Town Cagliari

Postcode 09125

Country Italy

Webpage www.beetobit.com

Legal Status of your organisation

### Research and Innovation legal statuses

Public body ..... unknown

Legal person ..... yes

Non-profit ..... unknown

International organisation ..... unknown

International organisation of European interest ..... unknown

Secondary or Higher education establishment ..... unknown

Research organisation ..... unknown

### Enterprise Data

SME self-declared status ..... unknown

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.





Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **BEETOBIT SRL**

### Department(s) carrying out the proposed work

#### Department 1

Department name

R&D

☐ not applicable

☒ Same as organisation address

Street

via Sidney Sonnino, 32

Town

Cagliari

Postcode

09125

Country

Italy

### Dependencies with other proposal participants

Character of dependence	Participant	
-------------------------	-------------	--



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **BEETOBIT SRL**

### Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title

Dr.

Sex

☒ Male

☐ Female

First name **Federico**

Last name **Caboni**

E-Mail **research@beetobit.com**

Position in org. R&D Director

Department R&D

☐ Same as organisation

☒ Same as organisation address

Street via Sidney Sonnino, 32

Town Cagliari

Post code 09125

Country Italy

Website

Phone 1

Phone 2

+XXX XXXXXXXXXX

Fax

+XXX XXXXXXXXXX



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **BSC**

**PIC**

999655520

**Legal name**

BARCELONA SUPERCOMPUTING CENTER - CENTRO NACIONAL DE SUPERCOMPUTACION

*Short name: BSC*

*Address of the organisation*

Street Calle Jordi Girona 31

Town BARCELONA

Postcode 08034

Country Spain

Webpage www.bsc.es

*Legal Status of your organisation*

#### Research and Innovation legal statuses

Public body .....yes

Legal person ..... yes

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....yes

#### Enterprise Data

SME self-declared status .....01/03/2005 - no

SME self-assessment ..... unknown

SME validation sme..... unknown

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **BSC**

### Department(s) carrying out the proposed work

#### Department 1

Department name

Earth Sciences

☐ not applicable

☐ Same as organisation address

Street

Jordi Girona 29

Town

Barcelona

Postcode

08034

Country

Spain

### Dependencies with other proposal participants

Character of dependence	Participant	
-------------------------	-------------	--

Proposal ID **776467**

Acronym

**MED-GOLD**Short name **BSC***Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title

Dr.

Sex

☐ Male☒ FemaleFirst name **Nube**Last name **Gonzalez-Reviriego**E-Mail **nube.gonzalez@bsc.es**

Position in org.

Postdoctoral Researcher

Department

Earth Sciences

☐ Same as organisation☐ Same as organisation address

Street

Jordi Girona 29

Town

Barcelona

Post code

08034

Country

Spain

Website

<https://www.bsc.es/>

Phone 1

+34 934137946

Phone 2

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Fax

+XXX XXXXXXXXXX

*Other contact persons*

First Name	Last Name	E-mail	Phone
Marta	Terrado	marta.terrado@bsc.es	+34 934137724
Dorota	Chmielewska	dorota.chmielewska@bsc.es	+34 934134082
Albert	Soret Miravet	albert.soret@bsc.es	+34 934134076

Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **CNR**

**PIC**

999979500

**Legal name**

CONSIGLIO NAZIONALE DELLE RICERCHE

Short name: **CNR**

Address of the organisation

Street PIAZZALE ALDO MORO 7

Town ROMA

Postcode 00185

Country Italy

Webpage www.cnr.it

Legal Status of your organisation

### Research and Innovation legal statuses

Public body .....yes

Legal person ..... yes

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....yes

### Enterprise Data

SME self-declared status ..... 18/05/2016 - no

SME self-assessment ..... unknown

SME validation sme..... 05/12/2008 - no

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **CNR**

### Department(s) carrying out the proposed work

#### Department 1

Department name

Institute of Biometeorology

☐ not applicable

☐ Same as organisation address

Street

Via dei Taurini, 19

Town

Rome

Postcode

00185

Country

Italy

### Dependencies with other proposal participants

Character of dependence	Participant	
-------------------------	-------------	--

Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **CNR**

### Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title

Dr.

Sex

☒ Male

☐ Female

First name **Massimiliano**

Last name **Pasqui**

E-Mail **m.pasqui@ibimet.cnr.it**

Position in org.

Researcher

Department

CONSIGLIO NAZIONALE DELLE RICERCHE

☒ Same as organisation

☐ Same as organisation address

Street

Via dei Taurini, 19

Town

Rome

Post code

00185

Country

Italy

Website

www.cnr.it

Phone 1

+390649937615

Phone 2

+XXX XXXXXXXXXX

Fax

+XXX XXXXXXXXXX

### Other contact persons

First Name	Last Name	E-mail	Phone
Piero	Toscano	p.toscano@ibimet.cnr.it	



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **DCOOP SOCIEDAD COOPERATIVA ANDAL**

**PIC**

946921567

**Legal name**

DCOOP SOCIEDAD COOPERATIVA ANDALUZA

Short name: **DCOOP SOCIEDAD COOPERATIVA ANDALUZA**

Address of the organisation

Street **CARRETERA DE CORDOBA SN**

Town **ANTEQUERA**

Postcode **29200**

Country **Spain**

Webpage **www.dcoop.es**

Legal Status of your organisation

#### Research and Innovation legal statuses

Public body .....no

Legal person ..... yes

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

#### Enterprise Data

SME self-declared status .....30/01/2014 - no

SME self-assessment ..... unknown

SME validation sme..... unknown

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **DCOOP SOCIEDAD COOPERATIVA ANDAL**

### Department(s) carrying out the proposed work

#### Department 1

Department name  ☐ not applicable

☒ Same as organisation address

Street

Town

Postcode

Country

#### Department 2

Department name  ☐ not applicable

☒ Same as organisation address

Street

Town

Postcode

Country

### Dependencies with other proposal participants

Character of dependence	Participant	
-------------------------	-------------	--

Proposal ID **776467**

Acronym

**MED-GOLD**

Short name

**DCOOP SOCIEDAD COOPERATIVA ANDAL***Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title

Dr.

Sex

☐ Male☒ FemaleFirst name **Silvia**Last name **Lopez-Feria**E-Mail **silvia.lopez@dcoop.es**

Position in org.

RESPONSIBLE FOR R&amp;D DEPARTMENT

Department

DCOOP SOCIEDAD COOPERATIVA ANDALUZA

☒

Same as organisation

☒

Same as organisation address

Street

CARRETERA DE CORDOBA SN

Town

ANTEQUERA

Post code

29200

Country

Spain

Website

www.dcoop.es

Phone 1

Phone 2

+34 952841451

Fax

+34 952842555

*Other contact persons*

First Name	Last Name	E-mail	Phone
Javier	Lopez	javier.lopez@dcoop.es	+34 952841451

Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **ec2ce**

**PIC**

923811414

**Legal name**

AGC Market View Services

*Short name: ec2ce*

*Address of the organisation*

Street Av Ramón Carande 9, bloque 10, 1-A

Town Sevilla

Postcode 41013

Country Spain

Webpage www.ec2ce.com

*Legal Status of your organisation*

#### Research and Innovation legal statuses

Public body .....no

Legal person ..... yes

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

#### Enterprise Data

SME self-declared status .....02/12/2015 - yes

SME self-assessment ..... 02/12/2015 - yes

SME validation sme..... unknown

**Based on the above details of the Beneficiary Registry the organisation is an SME (small- and medium-sized enterprise) for the call.**



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **ec2ce**

### Department(s) carrying out the proposed work

#### Department 1

Department name

AGC Market View Services

☐ not applicable

☒ Same as organisation address

Street

Av Ramón Carande 9, bloque 10, 1-A

Town

Sevilla

Postcode

41013

Country

Spain

### Dependencies with other proposal participants

Character of dependence	Participant	
-------------------------	-------------	--



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **ec2ce**

### Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title

Dr.

Sex

☒ Male

☐ Female

First name **Ricardo**

Last name **Arjona**

E-Mail **ricardo.arjona@ec2ce.com**

Position in org.

CTO/COO

Department

AGC Market View Services

☒ Same as organisation

☒ Same as organisation address

Street

Av Ramón Carande 9, bloque 10, 1-A

Town

Sevilla

Post code

41013

Country

Spain

Website

Phone 1

Phone 2

+XXX XXXXXXXXXX

Fax

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Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **GMV**

**PIC**

999905004

**Legal name**

GMV AEROSPACE AND DEFENCE SA

*Short name: GMV*

*Address of the organisation*

Street CALLE ISAAC NEWTON PARQUE TECNOLOG

Town TRES CANTOS

Postcode 28760

Country Spain

Webpage www.gmv.com

*Legal Status of your organisation*

#### Research and Innovation legal statuses

Public body .....no

Legal person ..... yes

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

#### Enterprise Data

SME self-declared status .....07/09/1989 - no

SME self-assessment ..... 07/09/1989 - no

SME validation sme..... unknown

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **GMV**

*Department(s) carrying out the proposed work*

**Department 1**

Department name

Business Development

☐ not applicable

☒ Same as organisation address

Street

CALLE ISAAC NEWTON PARQUE TECNOLOGICO DE

Town

TRES CANTOS

Postcode

28760

Country

Spain

*Dependencies with other proposal participants*

<i><b>Character of dependence</b></i>	<i><b>Participant</b></i>	
---------------------------------------	---------------------------	--



Proposal ID **776467**

Acronym

**MED-GOLD**Short name **GMV***Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title

Dr.

Sex

☐ Male☒ FemaleFirst name **Almudena**Last name **Sanchez**E-Mail **asanchez@gmv.com**

Position in org. Business Development Executive

Department Business Development

☐ Same as organisation☒ Same as organisation address

Street CALLE ISAAC NEWTON PARQUE TECNOLOGICO DE MADRID

Town TRES CANTOS

Post code 28760

Country Spain

Website www.gmv.com

Phone 1

Phone 2

+XXX XXXXXXXXXX

Fax

+XXX XXXXXXXXXX

*Other contact persons*

First Name	Last Name	E-mail	Phone
Juan	Suarez	jusuarez@gmv.com	



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **HORTA SRL**

**PIC**

985480134

**Legal name**

HORTA SRL

Short name: *HORTA SRL*

Address of the organisation

Street VIA GORRA 55

Town PIACENZA

Postcode 29122

Country Italy

Webpage www.horta-srl.com

Legal Status of your organisation

#### Research and Innovation legal statuses

Public body .....no

Legal person ..... yes

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

#### Enterprise Data

SME self-declared status ..... 31/12/2013 - yes

SME self-assessment ..... 31/12/2013 - yes

SME validation sme..... 06/08/2008 - yes

Based on the above details of the Beneficiary Registry the organisation is an SME (small- and medium-sized enterprise) for the call.



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **HORTA SRL**

### Department(s) carrying out the proposed work

#### No department involved

Department name

☒ not applicable

☐ Same as organisation address

Street

Town

Postcode

Country

### Dependencies with other proposal participants

Character of dependence	Participant	
-------------------------	-------------	--

Proposal ID **776467**

Acronym

**MED-GOLD**Short name **HORTA SRL***Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title

Dr.

Sex

☒ Male☐ FemaleFirst name **Pierluigi**Last name **Meriggi**E-Mail **p.meriggi@horta-srl.com**

Position in org. President, Legal representative

Department HORTA SRL

☒ Same as organisation☒ Same as organisation address

Street VIA GORRA 55

Town PIACENZA

Post code 29122

Country Italy

Website www.horta-srl.it

Phone 1 +39 0523 1860024

Phone 2 +39 0544 483261

Fax +39 0523 1860026

*Other contact persons*

First Name	Last Name	E-mail	Phone
Valentina	Manstretta	v.manstretta@horta-srl.com	



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **JRC**

**PIC**

999992304

**Legal name**

**JRC -JOINT RESEARCH CENTRE- EUROPEAN COMMISSION**

*Short name: JRC*

*Address of the organisation*

Street Rue de la Loi 200

Town BRUSSELS

Postcode 1049

Country Belgium

Webpage <http://www.jrc.ec.europa.eu>

*Legal Status of your organisation*

#### Research and Innovation legal statuses

Public body .....yes

Legal person ..... yes

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....yes

#### Enterprise Data

SME self-declared status .....21/08/2008 - no

SME self-assessment ..... unknown

SME validation sme..... 21/08/2008 - no

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **JRC**

### Department(s) carrying out the proposed work

#### Department 1

Department name

Directorate for Sustainable Resources, Food Security Unit

☐ not applicable

☐ Same as organisation address

Street

Via Enrico Fermi 2749

Town

Ispra (VA)

Postcode

21027

Country

Italy

### Dependencies with other proposal participants

Character of dependence	Participant	
-------------------------	-------------	--



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **JRC**

### Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title

Dr.

Sex

☒ Male

☐ Female

First name **Andrea**

Last name **Toreti**

E-Mail **andrea.toreti@ec.europa.eu**

Position in org.

Scientific Officer

Department

Directorate for Sustainable Resources, Food Security Unit

☐ Same as organisation

☐ Same as organisation address

Street

Via Enrico Fermi 2749

Town

Ispra (VA)

Post code

21027

Country

Italy

Website

<https://ec.europa.eu/jrc/en/person/andrea-toreti>

Phone 1

+39 0332 783630

Phone 2

+XXX XXXXXXXXXX

Fax

+XXX XXXXXXXXXX

Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **MET OFFICE**

**PIC**

999892685

**Legal name**

MET OFFICE

Short name: MET OFFICE

Address of the organisation

Street FitzRoy Road

Town EXETER

Postcode EX1 3PB

Country United Kingdom

Webpage www.metoffice.gov.uk

Legal Status of your organisation

#### Research and Innovation legal statuses

Public body .....yes

Legal person ..... yes

Non-profit .....no

International organisation .....unknown

International organisation of European interest .....unknown

Secondary or Higher education establishment .....unknown

Research organisation .....no

#### Enterprise Data

SME self-declared status ..... unknown

SME self-assessment ..... unknown

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name

**MET OFFICE**

### Department(s) carrying out the proposed work

#### Department 1

Department name

Applied Science

☐ not applicable

☒ Same as organisation address

Street

FitzRoy Road

Town

EXETER

Postcode

EX1 3PB

Country

United Kingdom

### Dependencies with other proposal participants

Character of dependence	Participant	
-------------------------	-------------	--

Proposal ID **776467**

Acronym

**MED-GOLD**Short name **MET OFFICE***Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title

Dr.

Sex

☐ Male☒ FemaleFirst name **Erika**Last name **Palin**E-Mail **erika.palin@metoffice.gov.uk**

Position in org.

Science Manager

Department

Applied Science

☐ Same as organisation☒ Same as organisation address

Street

FitzRoy Road

Town

EXETER

Post code

EX1 3PB

Country

United Kingdom

Website

www.metoffice.gov.uk

Phone 1

+44-1392-885717

Phone 2

+XXX XXXXXXXXXX

Fax

+44-1392-885681

*Other contact persons*

First Name	Last Name	E-mail	Phone
Michael	Sanderson	michael.sanderson@metoffice.gov.uk	+44-1392-884017

Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **NOA**

**PIC**

999653677

**Legal name**

NATIONAL OBSERVATORY OF ATHENS

Short name: NOA

Address of the organisation

Street LOFOS NYMFON

Town ATHINA

Postcode 11810

Country Greece

Webpage www.noa.gr

Legal Status of your organisation

#### Research and Innovation legal statuses

Public body .....yes

Legal person ..... yes

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....yes

#### Enterprise Data

SME self-declared status .....22/04/2008 - no

SME self-assessment ..... unknown

SME validation sme..... 22/04/2008 - no

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **NOA**

### Department(s) carrying out the proposed work

#### Department 1

Department name

Institute of Environmental Research and Sustainable Development,

☐ not applicable

☒ Same as organisation address

Street

LOFOS NYMFON

Town

ATHINA

Postcode

11810

Country

Greece

### Dependencies with other proposal participants

Character of dependence	Participant	
-------------------------	-------------	--

Proposal ID **776467**

Acronym

**MED-GOLD**Short name **NOA***Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title

Dr.

Sex

☒ Male☐ FemaleFirst name **Christos**Last name **Giannakopoulos**E-Mail **cgiannak@noa.gr**

Position in org.

Research Director

Department

Institute of Environmental Research and Sustainable Development,

☐ Same as organisation☒ Same as organisation address

Street

LOFOS NYMFON

Town

ATHINA

Post code

11810

Country

Greece

Website

Phone 1

Phone 2

+XXX XXXXXXXXXX

Fax

+XXX XXXXXXXXXX



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **SOGRAPE**

**PIC**

985406220

**Legal name**

SOGRAPE VINHOS S.A.

*Short name: SOGRAPE*

*Address of the organisation*

Street LUGAR DE ALDEIA NOVA

Town AVINTES

Postcode 4430-809

Country Portugal

Webpage www.sogrape.pt

*Legal Status of your organisation*

#### Research and Innovation legal statuses

Public body .....no

Legal person ..... yes

Non-profit .....no

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....no

Research organisation .....no

#### Enterprise Data

SME self-declared status .....22/07/1942 - no

SME self-assessment ..... unknown

SME validation sme..... unknown

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **SOGRAPE**

### Department(s) carrying out the proposed work

#### Department 1

Department name

Research & Development

☐ not applicable

☒ Same as organisation address

Street

LUGAR DE ALDEIA NOVA

Town

AVINTES

Postcode

4430-809

Country

Portugal

### Dependencies with other proposal participants

Character of dependence	Participant	
-------------------------	-------------	--



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **SOGRAPE**

### Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title

Dr.

Sex

☒ Male

☐ Female

First name **Antonio**

Last name **Graca**

E-Mail **antonio.graca@sogrape.pt**

Position in org. Head of Research & Development

Department Research & Development

☐ Same as organisation

☒ Same as organisation address

Street LUGAR DE ALDEIA NOVA

Town AVINTES

Post code 4430-809

Country Portugal

Website www.sograpevinhos.pt

Phone 1 +351933746104

Phone 2 +351227850300

Fax

+XXX XXXXXXXXX





Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **UMNG**

**PIC**

922021570

**Legal name**

Universidad Militar Nueva Granada

*Short name: UMNG*

*Address of the organisation*

Street Carrera 11 No 101-80

Town Bogota

Postcode 0000

Country Colombia

Webpage <http://www.umng.edu.co/>

*Legal Status of your organisation*

#### Research and Innovation legal statuses

Public body ..... unknown

Legal person ..... yes

Non-profit ..... unknown

International organisation ..... unknown

International organisation of European interest ..... unknown

Secondary or Higher education establishment ..... unknown

Research organisation ..... unknown

#### Enterprise Data

SME self-declared status ..... unknown

SME self-assessment ..... unknown

SME validation sme..... unknown

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**

Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **UMNG**

### Department(s) carrying out the proposed work

#### Department 1

Department name Applied Biology Program

☐ not applicable

☒ Same as organisation address

Street Carrera 11 No 101-80

Town Bogota

Postcode 0000

Country Colombia

### Dependencies with other proposal participants

Character of dependence	Participant	
-------------------------	-------------	--

Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **UMNG**

### Person in charge of the proposal

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title

Prof.

Sex

☒ Male

☐ Female

First name **Jose**

Last name **Cure**

E-Mail **jose.cure@unimilitar.edu.co**

Position in org.

Full Professor

Department

Applied Biology Program

☐ Same as organisation

☒ Same as organisation address

Street

Carrera 11 No 101-80

Town

Bogota

Post code

0000

Country

Colombia

Website

Phone 1

Phone 2

+XXX XXXXXXXXXX

Fax

+XXX XXXXXXXXXX



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **UNIVLEEDS**

**PIC**

999975426

**Legal name**

UNIVERSITY OF LEEDS

Short name: **UNIVLEEDS**

Address of the organisation

Street WOODHOUSE LANE

Town LEEDS

Postcode LS2 9JT

Country United Kingdom

Webpage www.leeds.ac.uk

Legal Status of your organisation

#### Research and Innovation legal statuses

Public body .....yes

Legal person ..... yes

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....yes

Research organisation .....no

#### Enterprise Data

SME self-declared status .....31/07/2015 - no

SME self-assessment ..... 31/07/2015 - no

SME validation sme..... unknown

Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **UNIVLEEDS**

### Department(s) carrying out the proposed work

#### Department 1

Department name

School of Earth and Environment

☐ not applicable

☒ Same as organisation address

Street

WOODHOUSE LANE

Town

LEEDS

Postcode

LS2 9JT

Country

United Kingdom

### Dependencies with other proposal participants

Character of dependence	Participant	
-------------------------	-------------	--

Proposal ID **776467**

Acronym

**MED-GOLD**Short name **UNIVLEEDS***Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title Sex ☐ Male ☒ FemaleFirst name **Marta**Last name **Bruno Soares**E-Mail **m.soares@leeds.ac.uk**Position in org. Department ☐ Same as organisation☒ Same as organisation addressStreet Town Post code Country Website Phone 1 Phone 2 Fax *Other contact persons*

First Name	Last Name	E-mail	Phone
Suraje	Dessai	s.dessai@leeds.ac.uk	
Sophia	Verhaeghe	eufunding@leeds.ac.uk	
Juliet	Jopson	s.j.jopson@leeds.ac.uk	



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **UTH**

**PIC**

986152150

**Legal name**

PANEPISTIMIO THESSALIAS

*Short name: UTH*

*Address of the organisation*

Street ARGONAFTON FILELLINON

Town VOLOS

Postcode 38221

Country Greece

Webpage

*Legal Status of your organisation*

#### Research and Innovation legal statuses

Public body .....yes

Legal person ..... yes

Non-profit .....yes

International organisation .....no

International organisation of European interest .....no

Secondary or Higher education establishment .....yes

Research organisation .....yes

#### Enterprise Data

SME self-declared status .....20/03/1984 - no

SME self-assessment ..... unknown

SME validation sme..... unknown

**Based on the above details of the Beneficiary Registry the organisation is not an SME (small- and medium-sized enterprise) for the call.**



Proposal ID **776467**

Acronym

**MED-GOLD**

Short name **UTH**

### Department(s) carrying out the proposed work

#### Department 1

Department name

Electrical and Computer Engineering

☐ not applicable

☒ Same as organisation address

Street

ARGONAFTON FILELLINON

Town

VOLOS

Postcode

38221

Country

Greece

### Dependencies with other proposal participants

Character of dependence	Participant	
-------------------------	-------------	--



Proposal ID **776467**

Acronym

**MED-GOLD**Short name **UTH***Person in charge of the proposal*

The name and e-mail of contact persons are read-only in the administrative form, only additional details can be edited here. To give access rights and basic contact details of contact persons, please go back to Step 4 of the submission wizard and save the changes.

Title

Prof.

Sex

☒ Male☐ FemaleFirst name **Thanasis**Last name **Korakis**E-Mail **korakis@uth.gr**

Position in org.

Professor

Department

Elentrical and Computer Engineering

☐ Same as organisation☒ Same as organisation address

Street

ARGONAFTON FILELLINON

Town

VOLOS

Post code

38221

Country

Greece

Website

www.uth.gr

Phone 1

+30241306070

Phone 2

+XXX XXXXXXXXXX

Fax

+XXX XXXXXXXXXX

*Other contact persons*

First Name	Last Name	E-mail	Phone
Stavroula	Maglavera	stavmag@the.forthnet.gr	

Proposal ID **776467**

Acronym **MED-GOLD**

## 3 - Budget for the proposal

No	Participant	Country	(A) Direct personnel costs/€	(B) Other direct costs/€	(C) Direct costs of sub- contracting/€	(D) Direct costs of providing financial support to third parties/€	(E) Costs of inkind contributions not used on the beneficiary's premises/€	(F) Indirect Costs / € (=0.25(A+B-E))	(G) Special unit costs covering direct & indirect costs / €	(H) Total estimated eligible costs / € (=A+B+C+D+F +G)	(I) Reimburse- ment rate (%)	(J) Max.EU Contribution / € (=H*I)	(K) Requested EU Contribution/ €
			?	?	?	?	?	?	?	?	?	?	?
1	Enea	IT	359920	51000	20000	0	0	102730,00	0	533650,00	100	533650,00	533650,00
2	Barilla G. E R. Fratelli Spa	IT	98775	19642	0	0	0	29604,25	0	148021,25	100	148021,25	148021,25
3	Beetobit Srl	IT	213200	4800	0	0	0	54500,00	0	272500,00	100	272500,00	272500,00
4	Bsc	ES	328500	27500	0	0	0	89000,00	0	445000,00	100	445000,00	445000,00
5	Cnr	IT	189000	22800	0	0	0	52950,00	0	264750,00	100	264750,00	264750,00
6	Dcoop Sociedad Cooperativa	ES	200501	17110	0	0	0	54402,75	0	272013,75	100	272013,75	272013,75
7	Ec2ce	ES	184996	31150	0	0	0	54036,50	0	270182,50	100	270182,50	270182,50
8	Gmv	ES	335358	42320	0	0	0	94419,50	0	472097,50	100	472097,50	472097,50
9	Horta Srl	IT	122066	37900	0	0	0	39991,50	0	199957,50	100	199957,50	199957,50
10	Jrc	BE	265573	30000	0	0	0	73893,25	0	369466,25	100	369466,25	369466,25



Proposal ID **776467**

Acronym **MED-GOLD**

11	Met Office	UK	151390	21800	0	0	0	43297,50	0	216487,50	100	216487,50	216487,50
12	Noa	EL	179800	7350	0	0	0	46787,50	0	233937,50	100	233937,50	233937,50
13	Sogrape	PT	134957	94150	60000	0	0	57276,75	0	346383,75	100	346383,75	346383,75
14	Umng	CO	27820	11000	0	0	0	9705,00	0	48525,00	100	48525,00	48525,00
15	Univleeds	UK	424800	57596	0	0	0	120599,00	0	602995,00	100	602995,00	602995,00
16	Uth	EL	215000	21000	0	0	0	59000,00	0	295000,00	100	295000,00	295000,00
	Total		3431656	497118	80000	0	0	982193,50	0	4990967,50		4990967,50	4990967,50

Proposal ID **776467**

Acronym **MED-GOLD**

## 4 - Ethics issues table

<b>1. HUMAN EMBRYOS/FOETUSES</b>		Page
Does your research involve <a href="#">Human Embryonic Stem Cells (hESCs)</a> ?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Does your research involve the use of human embryos?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Does your research involve the use of human foetal tissues / cells?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
<b>2. HUMANS</b>		Page
Does your research involve human participants?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Does your research involve physical interventions on the study participants?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
<b>3. HUMAN CELLS / TISSUES</b>		Page
Does your research involve human cells or tissues (other than from Human Embryos/ Foetuses, i.e. section 1)?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
<b>4. PERSONAL DATA</b>		Page
Does your research involve personal data collection and/or processing?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Does your research involve further processing of previously collected personal data (secondary use)?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
<b>5. ANIMALS</b>		Page
Does your research involve animals?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
<b>6. THIRD COUNTRIES</b>		Page
In case non-EU countries are involved, do the research related activities undertaken in these countries raise potential ethics issues?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Do you plan to use local resources (e.g. animal and/or human tissue samples, genetic material, live animals, human remains, materials of historical value, endangered fauna or flora samples, etc.)?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Do you plan to import any material - including personal data - from non-EU countries into the EU?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Do you plan to export any material - including personal data - from the EU to non-EU countries?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
In case your research involves <a href="#">low and/or lower middle income countries</a> , are any benefits-sharing actions planned?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Could the situation in the country put the individuals taking part in the research at risk?	<input type="radio"/> Yes <input checked="" type="radio"/> No	

Proposal ID **776467**

Acronym **MED-GOLD**

<b>7. ENVIRONMENT &amp; HEALTH and SAFETY</b>		Page
Does your research involve the use of elements that may cause harm to the environment, to animals or plants?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Does your research deal with endangered fauna and/or flora and/or protected areas?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
Does your research involve the use of elements that may cause harm to humans, including research staff?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
<b>8. DUAL USE</b>		Page
Does your research involve dual-use items in the sense of Regulation 428/2009, or other items for which an authorisation is required?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
<b>9. EXCLUSIVE FOCUS ON CIVIL APPLICATIONS</b>		Page
Could your research raise concerns regarding the exclusive focus on civil applications?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
<b>10. MISUSE</b>		Page
Does your research have the potential for misuse of research results?	<input type="radio"/> Yes <input checked="" type="radio"/> No	
<b>11. OTHER ETHICS ISSUES</b>		Page
Are there any other ethics issues that should be taken into consideration? Please specify	<input type="radio"/> Yes <input checked="" type="radio"/> No	

I confirm that I have taken into account all ethics issues described above and that, if any ethics issues apply, I will complete the ethics self-assessment and attach the required documents. ☒

[How to Complete your Ethics Self-Assessment](#)

Proposal ID **776467**

Acronym **MED-GOLD**

## 5 - Call specific questions

### *Extended Open Research Data Pilot in Horizon 2020*

If selected, applicants will by default participate in the [Pilot on Open Research Data in Horizon 2020](#)<sup>1</sup>, which aims to improve and maximise access to and re-use of research data generated by actions.

However, participation in the Pilot is flexible in the sense that it does not mean that all research data needs to be open. After the action has started, participants will formulate a [Data Management Plan \(DMP\)](#), which should address the relevant aspects of making data FAIR – findable, accessible, interoperable and re-usable, including what data the project will generate, whether and how it will be made accessible for verification and re-use, and how it will be curated and preserved. Through this DMP projects can define certain datasets to remain closed according to the principle "as open as possible, as closed as necessary". A Data Management Plan does not have to be submitted at the proposal stage.

Furthermore, applicants also have the possibility to opt out of this Pilot completely at any stage (before or after the grant signature). In this case, applicants must indicate a reason for this choice (see options below).

Please note that participation in this Pilot does not constitute part of the evaluation process. Proposals will not be penalised for opting out.

We wish to opt out of the Pilot on Open Research Data in Horizon 2020.

☐ Yes

☒ No

Further guidance on open access and research data management is available on the participant portal: [http://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/open-access-dissemination\\_en.htm](http://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/open-access-dissemination_en.htm) and in general annex L of the Work Programme.

<sup>1</sup> According to article 43.2 of Regulation (EU) No 1290/2013 of the European Parliament and of the Council, of 11 December 2013, laying down the rules for participation and dissemination in "Horizon 2020 - the Framework Programme for Research and Innovation (2014-2020)" and repealing Regulation (EC) No 1906/2006.



# MED-GOLD

## Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)

### List of participants

Participant No *	Participant organisation name	Country
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2	Barilla G. & R. Fratelli ( <b>Barilla</b> )	Italy
3	<b>Beetobit</b>	Italy
4	Barcelona Supercomputing Center ( <b>BSC</b> )	Spain
5	Consiglio Nazionale delle Ricerche ( <b>CNR</b> )	Italy
6	<b>DCOOP</b>	Spain
7	Easytosee Agtech ( <b>EC2CE</b> )	Spain
8	GMV Aerospace and Defence ( <b>GMV</b> )	Spain
9	<b>HORTA</b>	Italy
10	European Commission, Joint Research Centre ( <b>JRC</b> )	Belgium
11	Met Office ( <b>MetOffice</b> )	United Kingdom
12	National Observatory of Athens ( <b>NOA</b> )	Greece
13	Sogrape Vinhos ( <b>SOGRAPE</b> )	Portugal
14	Universidad Militar Nueva Granada ( <b>UMNG</b> )	Colombia
15	University of Leeds ( <b>UNIVLEEDS</b> )	United Kingdom
16	University of Thessaly ( <b>UTH</b> )	Greece

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## Executive summary

### Relevance of MED-GOLD

The MED-GOLD project will demonstrate the proof-of-concept for climate services in the agriculture sector by developing case studies for three staples of the Mediterranean food system: **grape, olive and durum wheat**. Agriculture is primarily weather and climate-driven and future climatic conditions will further increase its vulnerability to crop failure and pest damage (Rosenzweig et al. 2014). Nowhere in the globe climate change will have consequences as dramatic as in the Mediterranean Basin, where higher than average projected climate change threatens an extremely rich and intertwined biological and cultural diversity, and will increase its vulnerability to natural hazards including biological invasions (Agnoletti & Emanuelli 2016). The challenge for this region is how to increase the resilience of this complex ecological, economic, and cultural heritage in an era of decreasing resources and climate change (GFN 2015).

*Climate services*, understood as the transformation of climate-related data and other information into customised products to support decisions and a better management, have the potential to support the transition towards a climate-resilient and low-carbon society (EC 2015).

The aim of MED-GOLD is to translate state-of-the-art climate data and climate predictions — at the seasonal timescale and beyond — into actionable information for the end-users. MED-GOLD will benefit from the contribution of world leaders in the production of wine, olive oil and pasta (SOGRAPE, DCOOP, and Barilla, respectively) who will play the role of problem-holders in the co-design of climate services for the three case studies. The participation of those three *champions* in the co-design process will also catalyze and dynamise the engagement of a wider community of users in these sectors across Europe.

### Expected outcomes and innovation capacity

A major goal of the MED-GOLD project is to change the way climate-driven risks are perceived and managed across the agri-food system

The expected outcomes from MED-GOLD include

- creating tailored and potentially replicable climate services for three case studies in the agriculture sector (Work Packages – WPs – 2, 3, 4; WP6 for potential replicability);
- developing innovative tools for the management of risks associated to the spread of pests, diseases, yield losses and other climate related threats for the cultivation of grape, olive, and durum wheat (Tasks 2.2, 3.2, 4.2);
- supporting decision-making with demonstrated added value for the management of climate-driven risks including pests (a new area in climate services) (Tasks 2.4, 3.4, 4.4; WP5);
- creating a data interface that will allow the exploitation of climate data from different sources (including the Copernicus Data Store) for the agricultural sector (Task 1.4);
- promoting a well informed and connected community of Mediterranean users of climate services in the agricultural sector (WP5).

The replicability of a common methodological framework is one of the strengths of MED-GOLD and it will build on a common ICT infrastructure and data management platform (Task 1.4) of general applicability to climate-driven problems of economic relevance beyond the agriculture sector. The ability to extend and build upon this climate service methodology will promote more robust European and global actions in the food production value chain as well as a more informed and connected user community beyond the case studies considered for the project. For example, the replicability of the MED-GOLD methodology will be tested for coffee — the world's most important agricultural commodity that has a trading volume second only to crude oil (Igami, 2015) (WP6, Task 6.2).

### Competence of the consortium

The consortium is multi-disciplinary with industrial partners, SMEs, climate impact and adaptation experts, social scientists, economists, agronomist and climate modelers (see section 3.3). In addition, the case studies selected are led by partners of the project who are also world leaders in their own sectors: SOGRAPE (the largest family-owned Portuguese wine company), DCOOP (a Spanish cooperative group connecting thousands of family farms and the world's largest olive oil producer), and BARILLA (a family-owned group and by far the world's leading pasta producer). A large and diversified board of stakeholders from the three sectors are also officially committed to contribute to the project (Table 3.3.1a). Specific actions have been planned to engage with these stakeholders so that they can contribute to the co-design and co-development the pilot climate services (Tasks 2.1, 3.1, 4.1). The

scientific partners have extensive experience in academic research and in developing response mechanisms and actions to address user needs (ENEA, BSC, CNR, JRC, MetOffice, NOA, UMNG, UNIVLEEDS, UTH). The commitment of MED-GOLD toward the sustainable development of climate services in Europe is demonstrated by the involvement of SMEs and private companies (Beetobit, EC2CE, HORTA, GMV), some of which are pioneer providers of climate services. A committee of external advisors (Table 3.2.1a) will also assist MED-GOLD in pursuing the highest possible quality of innovative services as well as maintaining a dynamic interaction with the climate services sector globally.

### **Proposed approach**

MED-GOLD aims to engage directly with end-users and problem holders (SOGRAPE, DCOOP, Barilla as well as the board of stakeholders) in the co-design and co-development process of the pilot services (Figure 1).

Initial working hypotheses for each test case have already been identified in the proposal in cooperation with the industrial partners (Tasks 2.1, 3.1, 4.1). MED-GOLD adopts a seamless approach whereby innovative climate service tools for the management of climate risks build upon existing ones, and will benefit from the existence of seasonal climate predictions and long-term climate change projections (Tasks 2.2, 3.2, 4.2). The new climate service tools will first be evaluated by applying them retrospectively to recent adverse climate events for testing their added value to the users decision-making processes. The pilot services will then be tested by the users in real operations during the project (Tasks 2.3, 3.3, 4.3). An evaluation of the added-value generated by the climate services to the users will then be conducted for each case study by adopting specific methodologies (Tasks 2.4, 3.4, 4.4). SOGRAPE, DCOOP, and Barilla will support and catalyse the interest of a larger community of users in the wine, olive oil and pasta sectors (WP5) as well as enhance the potential use and replicability by showcasing the pilot climate service applications to other users (WP6).

### **Impact and added value**

MED-GOLD will create added value by enabling access to innovative climate data from existing modeling platforms and by demonstrating practical solutions for adopting a consolidated methodological framework across the case studies. In addition, MED-GOLD will also promote market uptake by engaging with a community of end-users and stakeholders in Europe that also play a major role in the supply chain of the global market.

The potential replicability of the climate services beyond the duration of the project will be pursued through a) the development and adoption of a suitable data management plan (Task 1.4); b) the adoption of consolidated modeling platforms already in use by a vast community of users of agro-meteorological services.; c) the coordination and collaboration with similar initiatives in Europe and at the global scale (Task 6.1); and d) the systematic documentation of the operational protocols adopted throughout the pilot services (Task 6.4).

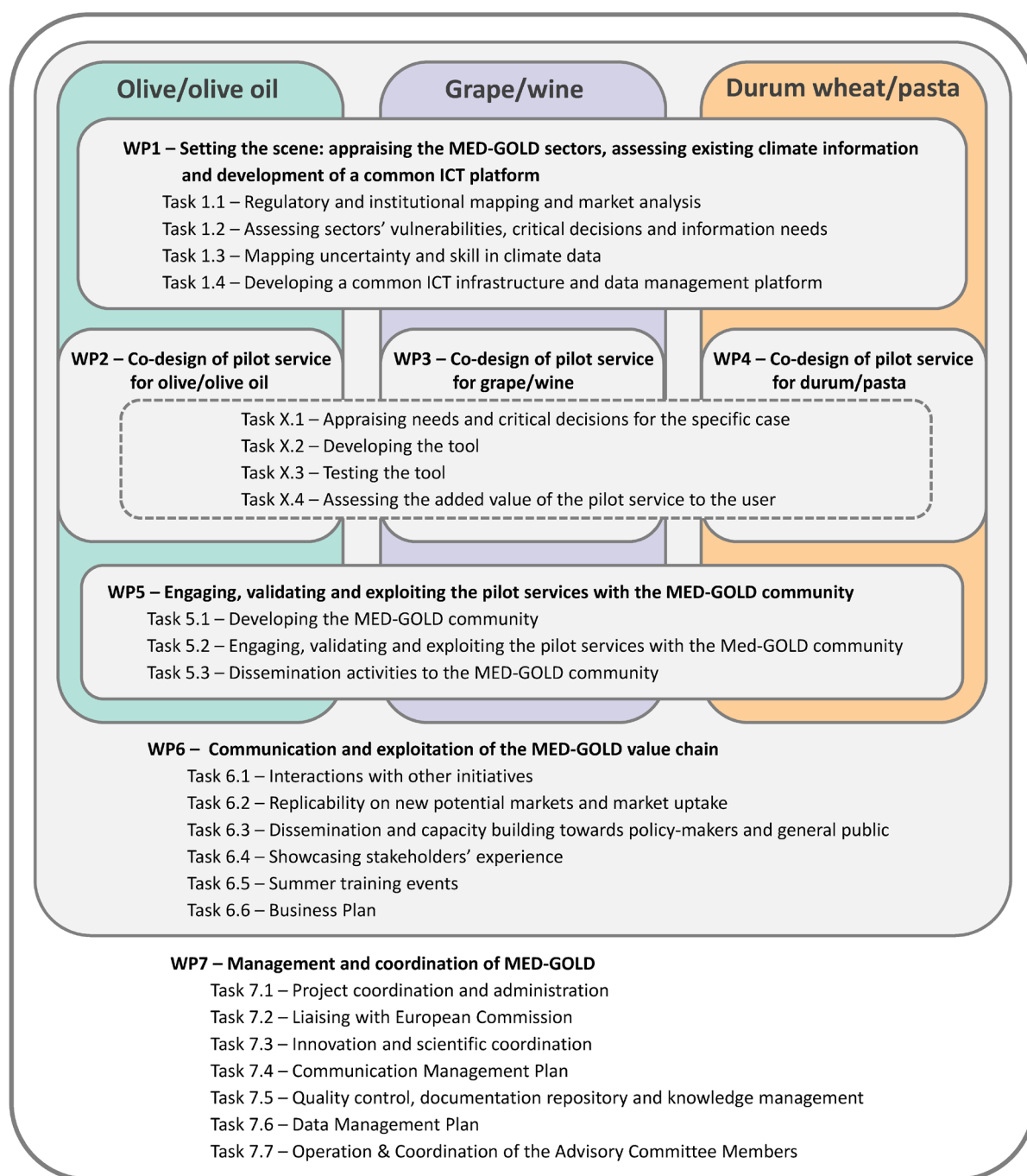
The cumulative added value of MED-GOLD will range from enhancing agricultural management activities (e.g. effectiveness, value creation, optimised opportunities and minimised risk in food production chains) to supporting and informing policy-making (e.g. Sustainable Development Goals and COP 21 Paris Agreement) at the Mediterranean, European and global levels. This is due to the weight of olive, grape, and durum wheat as the raw materials for producing global food commodities such as olive oil, wine and pasta. These in turn, are key staple foods of the Mediterranean diet with demonstrated potential for a) contrasting the increasing homogeneity in global food supplies with important food security implications and significant health benefits (Khoury et al. 2014), and b) for reducing the ecological footprint of the global food system (Sáez-Almendros et al. 2013).

### **Exploitation approach and capacity**

The entire value chain for climate services in agriculture is represented in MED-GOLD. Businesses in the three sectors (olive, grape, and durum wheat) will benefit from the projects' innovations that support the planning of optimized climate risk management strategies. Service providers in the consortium will acquire new tools for their customers (WP2, WP3, WP4). New opportunities for the development of Infrastructure as a Service (IaaS) will be created under MED-GOLD (WP1). The need for better informed policy making at the EU level is also a target of MED-GOLD with a specific focus on the implementation of the Sustainable Development Goals (WP6). An Intellectual Property Ownership framework has been drafted and will be finalized in the grant agreement. This will allow the partners of MED-GOLD to exploit the results of the project beyond its duration. The potential market for the services developed in MED-GOLD has a global reach and has the largest share of both producers and consumers in the Mediterranean area. Specific actions, have been planned in MED-GOLD to engage with a community of potential users (WP5) to disseminate the results of the project (WP6) and to analyse the components of a sound business model that would allow climate services to work in a commercial and competitive environment (Task 6.2).

## Value for money

MED-GOLD makes extensive use and capitalizes upon the knowledge and experience acquired in past FP7 projects as well as ongoing Copernicus contracts in climate services (e.g. EUPORIAS, CLIM-RUN, SPECS, SECTEUR, AgriCLASS) where many of the MED-GOLD partners were/are actively involved. A specific objective of MED-GOLD is to exploit existing climate data with additional analysis on the performance of raw climate data (which will be conducted only when strictly required). In MED-GOLD, the development of new climate services tools consists largely on the upgrade and tailoring of existing modeling platforms so that the exploitation (and cost) of technical capacities is optimised. The outreach of MED-GOLD will be enhanced by involving world leaders in the respective sectors, which will ensure a significant level of visibility and dissemination of the MED-GOLD activities and outcomes.



**Figure 1: The Work Package structure of MED-GOLD**

# 1 Excellence

## 1.1 Objectives

The general objective MED-GOLD is to make European agriculture and food systems more competitive, resilient, sustainable and efficient in the face of climate change, by using climate services to minimize climate-driven risks/costs and seize opportunities for added-value.

Specifically, MED-GOLD responds to the priority of developing **climate services** that turn the increasingly growing wealth of climate-related data into tailored information that can improve the decision-making in agriculture.

Agriculture is primarily climate-driven and hence highly vulnerable to climate variability and change (see e.g., Hillel and Rosenzweig 2010, 2012). Europe includes primary climate change hot spots – regions such as the Mediterranean Basin where severe climate change is predicted. Evidence suggests that the Mediterranean region is under immediate threat of shifting climate patterns and the associated ecological, economic and social effects (Giorgi 2006, Diffenbaugh and Giorgi 2012, Agnoletti & Emanueli 2016, Alessandri et al. 2014, Guiot and Cramer 2016). However, the use of climate-related data for the management of climate-related risks is still limited (Jones et al., 2016, Street, 2016). As such, the need to demonstrate the proof-of-concept for effective climate services remains a priority, in Europe and worldwide, particularly in agriculture where the inherent complexity of biological systems adds to that of a changing climate system and of a competitive and globalised market for commodities, making agricultural management unprecedentedly difficult.

**MED-GOLD will demonstrate the proof-of-concept for climate services in the agriculture sector by developing case studies for three staples of the Mediterranean food system: grapes, olives and durum wheat.** These crops, and the related food products, are of utmost ecological, economic, and cultural relevance to the Mediterranean region, Europe and worldwide. Olive oil, wine, and pasta are not only key pillars of the Mediterranean diet – part of the UNESCO Intangible Cultural Heritage of Humanity – but also important food commodities within a global market (EU countries exported in 2014 those three products to the value of about 37 billion of dollars, data from BACI International Trade Database). Hence, there is considerable potential for developing climate services with high added-value for olive, grape, and durum wheat. Specific objectives of MED-GOLD are described in Table 1.1.

**Table 1.1** Specific objectives of MED-GOLD with reference to WP and Deliverables that contribute towards each objective.

Objectives	Description of the objective	WPs and Deliverables contributing to objectives
1	To co-design, co-develop, test, and assess the added value of proof-of-concept climate services for olive, grape, and durum wheat	WP2, WP3, WP4 Deliverables: D2.2, D2.4, D2.5, D3.2, D3.4, D3.5; D4.2, D4.4, D4.5
2	To refine, validate, and upscale the three pilot services with the wider European and global user communities for olive, grape, and durum wheat	WP5 Deliverables: D5.1, D5.2
3	To ensure replicability of MED-GOLD climate services in other crops/climates (e.g., coffee) and to establish links to policy making globally	WP6 Deliverables: D6.4, D6.9
4	To implement a comprehensive communication and commercialization plan for MED-GOLD climate services to enhance market uptake	WP6, WP7 Deliverables: D6.1, D6.3, D6.4, D6.10, D7.3
5	To build better informed and connected end-user communities for the global olive oil, wine, and pasta food systems and related policy making	WP5, WP6 Deliverables: D5.1, D5.2

## 1.2 Relation to the work programme

MED-GOLD addresses topic SC5-01-2016-2017 - Exploiting the added value of climate service (subtopic b: From climate service concepts to piloting and proof-of-concept).

How can Mediterranean societies thrive in an era of decreasing resources under climate change (Global Footprint Network 2015)? This is the key underlying challenge that the present proposal addresses. Responding this challenge requires the mainstreaming of climate change into decisions and actions at all levels via climate services.

The Mediterranean is a unique biodiversity hotspot that is particularly threatened by climate change. Increasing unsustainable consumption and development trends threaten existing ecological assets that are the region's most valuable sources of strength and to which climate change adds as an additional layer of complexity that hinders the adequate management of these trends, often making them worse (see Guiot and Cramer, 2016). Overall, the Mediterranean region is using approximately 2.5 times more renewable resources than its ecosystems can provide, with food, transportation and housing being the three major components of the Mediterranean ecological footprint (GFN 2015). In particular, food systems are by nature the most vulnerable to climate change, and it is therefore in agriculture that **climate services** have the largest potential to become the intelligence behind the transition to a climate-resilient and low-carbon European society (EC, 2015).

The objectives of MED-GOLD are consistent with the broader scope of the *European Roadmap for Climate Services (ERCS)*<sup>1</sup>. In particular, MED-GOLD contributes to:

*Challenge 1 of the ERCS: Enabling market growth*

- Main activity 1.1: Assessing the nature of the climate services market
- Main activity 1.3: Demonstrating the added value

*Challenge 3 of the ERCS: Enhancing the quality and relevance of climate services*

- Main activity 3.1: information frameworks to support climate services
- Main activity 3.3: Climate information and end-user needs: innovation and products

A complete outline of how MED-GOLD addresses the specific challenges for the topic SC5-01-2016-201(b) is described in Table 1.2.

**Table 1.2.** How MED-GOLD addresses the specific challenge for topic SC5-01-2016-201(b).

Specific challenge and scope for topic SC5-01-2016-2017 (b)	How MED-GOLD addresses the challenge
<i>This action addresses areas where climate services show potential for being developed.</i>	Existing decision support systems already in use by a community of potential users of climate services will be enhanced by allowing the use of climate-related data. Agricultural pests, crop yield and quality will be included in climate services given their high and almost unexplored potential effect that is mainly driven by weather.
<i>Increasing the added value of climate services relies on matching the demand for services and the competences in the field.</i>	Major European and global industrial players that already use climate related information in decision-making, will co-design climate services.
<i>However, the availability of data, information and services does not always correspond to users' needs.</i>	Co-design of climate services with industrial users, wide engagement of user communities, contributions from technical bodies ranging from universities to national research centers/weather services/climate observatories, and from innovative ICT SMEs with strong data expertise – this is designed to jointly address that shortcoming.
<i>Within a co-designed process, there is a need to develop future applications in the most promising fields and to mobilize end-user communities where demonstration</i>	Agriculture is of primary interest for climate service investments, and agricultural pests are a major source of uncertainty (crop losses range from 26.2% to 40.3%, Oerke, 2006) that is largely climate-driven but mostly unexplored. This makes climate services that include pests a very promising area that MED-GOLD will explore, but where demonstration projects are

<sup>1</sup> [https://ec.europa.eu/research/environment/index.cfm?pg=climate\\_services](https://ec.europa.eu/research/environment/index.cfm?pg=climate_services)

<i>projects are not yet feasible.</i>	not yet feasible.
<i>This action should co-design (involving both suppliers/purveyors and users) pilot applications that support the proof-of-concept phase of climate services with high added-value in potential markets.</i>	Pilot climate service applications developed under MED-GOLD have immense cumulative added value at levels ranging from agricultural management to policy-making in ecological, economic, and cultural terms. Olive, grape, and durum wheat crop systems are the basis for producing important food commodities with a global market such as olive oil, wine and pasta that are hallmarks of the world heritage Mediterranean diet, and hence have immense potential for contrasting the increasing homogeneity in global food supplies (with food security implications and significant health benefits) and for reducing the ecological footprint of the global food system.
<i>The action should create case studies to address methodological issues, develop the user/provider interface, and test the relevance of climate services with a view to co-designing demonstration projects with the end-users at a later stage.</i>	The three pilot climate service applications planned under MED-GOLD will be co-designed with key industrial players of global relevance, will address methodological issues including how to factor agricultural pests in climate informed decision-making, and will be validated and scaled up with the wider user communities so as to lay the groundwork for demonstration projects.
<i>This action focuses on broad areas of application with a European or global scope. Proposals should take into account and where possible build upon activities addressed by other initiatives such as the ERA-NET Cofund action on climate services opened in the Horizon 2020 Societal Challenge 5 call of 2015.</i>	Agriculture and specifically traditional Mediterranean crop systems are a broad area of application for climate services with both European and global scope: olive, grape, and durum wheat are cosmopolitan crops that are grown across the globe (Asia, North and South America, and Australia) where climate allows. Project partners such as CNR-IBIMET are actively involved in the ERA-NET Cofund action on climate services and have insured that MED-GOLD takes into account and builds upon the ERA-NET initiative.
<i>Actions should foresee activities to cluster with other projects financed under this topic and – if possible – also under other parts of Horizon 2020.</i>	MED-GOLD cluster with activities addressed by other related initiatives on climate services (see Table 1.3).

### 1.3 Concept and methodology

#### 1.3.1 Concept

Agriculture is perceived as one of the economic sector where investments in climate services are likely to make the biggest impact (Vaughan et al., 2016). The main assumption underpinning the overall concept of this proposal is that decision making processes in the agriculture sector can still, to a large extent, be optimized and better adapted to natural and anthropogenic fluctuations and changes in the climate system. For example, average crop losses due to pests range between 26.2 and 40.3 % worldwide (Oerke, 2006). As such, pest problems are a substantial source of uncertainty in agriculture with climate being their main driver. Similarly, the sub-optimal use of fertilizers can significantly affect the carbon footprint of many production chains, thereby driving primary production against important EU targets in terms of the reductions of greenhouse-gas emissions.

Groundbreaking findings in the field of climate predictions (Dunstone et al., 2016; Palin et al., 2016; Scaife et al., 2014) have led to high expectations about the possibility of using climate predictions to improve decision-making in the long-term (seasonal timescale and beyond) planning of human activities. However, climate data and climate information at different spatial and temporal scales have not yet been exploited to their full potential and may have a significant impact in improving key decisions across different sectors (Clark et al., 2017; Gunda et al., 2017; Capa-Morocho et al., 2017).

The sector of agriculture has been the object of significant research recently (see Table 1.3). However, while potentially relevant tools, data and methodologies have been developed, less effort has been dedicated to implement and test the usability of the climate services developed in key decisions in order to generate their full



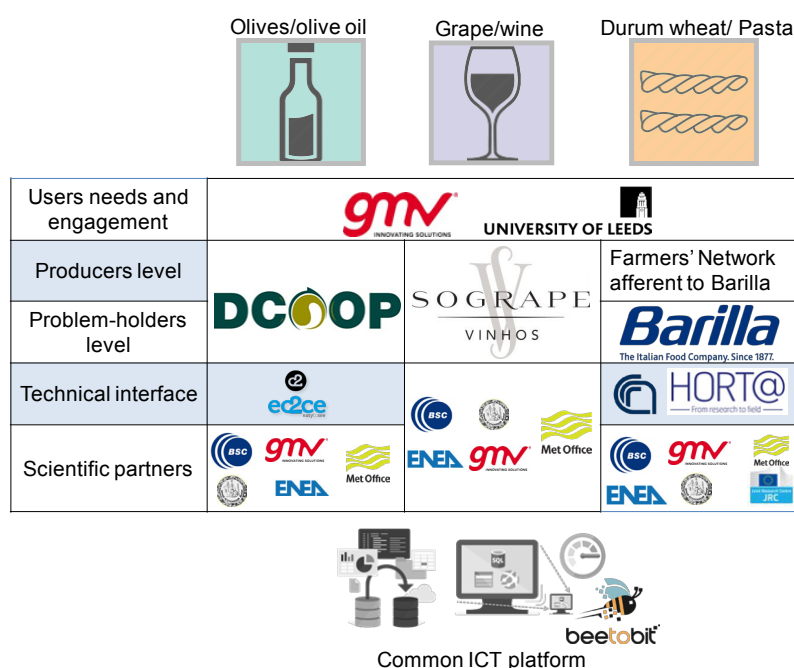


Figure 1.3.1a: MED-GOLD pilot services

impact on the ground. Consequently, the potential benefits of using climate services in the agriculture sector is not yet fully understood. **The impact of climate services in the agriculture sector needs to be demonstrated with real-world pilots that can illustrate the usefulness and usability of climate service in this sector.** This is the main objective of MED-GOLD.

It has been demonstrated in previous FP7 projects such as EUPORIAS<sup>2</sup>, that the integration of sector specific competences with expertise in the broader field of climate research is a key ingredient for the development of relevant innovations that are able to bring an impact on economic activities. Past experiences have led to the concept of co-designing new solutions, whereby unforeseen opportunities are likely to emerge in an interdisciplinary environment. While market based climate services have been proposed as a fundamental building block for climate change adaptation, a well defined demand for climate services for agriculture is still lacking and needs to be stimulated by presenting success stories of the real benefits that they can bring to stakeholders. A community of potential users needs to be created by raising awareness on potential threats and by bringing new techniques, tools and methodologies accessible to the end-users.

The central idea of MED-GOLD is to co-design climate services for agriculture by focusing on three crops that are typical of the Mediterranean area: olives, grape and durum wheat.

A preliminary market analysis, comprehensive mapping of the existing initiatives and networks in the three sectors, along with a summary of the overall quality of the climate data available will enable MED-GOLD to better frame the proposed pilot services. A common framework will be adopted to develop innovations in the three sectors (WP1).

The pilot services (Fig.1.3.1a) will be the result of a co-design process where three lead actors in the food industry of each sector - DCOOP for olive oil, SOGRAPE for wine and BARILLA for pasta - will guide a team of climate scientists, agronomists and economists in developing innovative solutions for managing their climate related risks and improve their decision-making processes. The co-development will assure continuous interaction and feedback with the users of the pilot services. Existing modeling tools already in use by these actors for the provision of agro-meteorological services will be enhanced and adapted in order to provide information at different climate timescales - from seasonal to decadal time scale and beyond (WP2, WP3, WP4).

While specific risks exist for each crop, which also imply sector specific risk management solutions, two main areas of intervention have been identified that will be the object of investigation in the course of the project (Table 1.4).

- At the shorter time scale (seasonal timescale): the main theme for the three sectors will be the optimization of inputs, which include a broad range of goods, ranging from seeds (different varieties can be adopted in the same area), to pesticides and fertilizers. Tailored climate information will assist the optimization of farming practices, with the objective of improving the quality and quantity of products.

<sup>2</sup> <http://www.euporias.eu>

In particular, the possibility of accessing a new generation of climate prediction data at the seasonal timescale is considered as an unprecedented opportunity for improving the preparation and scheduling of key farming activities during the production season.

- At the longer time scale (climate scenarios): the likelihood of significant climatic changes in cultivation areas for the three sectors is the theme of main interest. Climate conditions may favor a new variety of the same plant in a given area or, favorable conditions for one of the selected crops may spread to new regions. Climate scientists and experts in the three pilot sectors will identify key decisions and planning activities that would help the adaptation to new climatic conditions.

Pilot service applications, success stories and main outcomes will be discussed and validated by a Community of 'MED-GOLD Users' throughout the project (WP5). The industrial partners of the consortium will play a leading role here in catalysing the interests from other stakeholders and organisations in the respective sectors (Table 3.3.1.a).

A comprehensive communication and commercialization plan will allow MED-GOLD to **foster wider cooperation beyond the duration of the project and to stimulate a market for climate services in the agricultural sector** (WP6).

The ambition of MED-GOLD is to reach Technology Readiness Level (TRL 6-7) at the end of the project: prototypes demonstration in operational environment (See Table 1.3.1a)

**Table 1.3.1a: Readiness Level of Key Technology Components (TRL: technology readiness level from 1 to 9=max readiness)**

Technology	Target TRL	Status Description
<b>WOFOST</b>	6	The WOFOST crop growth model is an open-source model implemented in several different languages and used by many institutions. Mean climatic conditions and drought are fully taken into account. While, a beta version modelling also the effect of heat stress has been recently developed by JRC. The effects of water excess have not been included yet.
<b>Delphi</b>	6	Delphi modelling system is a CNR-BARILLA proprietary software to perform yield and grain protein content forecasting as well as risk of pest and diseases
<b>Agro-climatic indices</b>	7	Several open-source softwares exist to derive relevant agro-climatic indicators. JRC has recently developed and implemented an R suite to derive indices linked to heat and water stress.
<b>BSC R suite for assessment of seasonal forecast</b>	6	BSC has developed the s2dverification R package ( <a href="http://cran.r-project.org/web/packages/s2dverification/index.html">http://cran.r-project.org/web/packages/s2dverification/index.html</a> ), which includes, among others, functions for data retrieval, bias adjustment techniques, deterministic and probabilistic verification measures, etc. BSC will implement new functions, as part of MED-GOLD, for obtaining several climatic indicators tailored to the Champions' needs. BSC aim at achieving TRL 6, where the technology will be demonstrated to be applied in a wine production environment.
<b>CASAS Global physiologically based demographic models (CASAS-PBDMs)</b>	6	The capacity for modeling a variety of tri-trophic agroecosystems in a general way using PBDM agro-ecosystem models including the olive/olive fly system (Gutierrez et al., 2009) and the coffee system (Rodríguez et al. 2011, 2013) will be implemented under the MED-GOLD project as a scalable modern computing platform in the form of an application as a service, as part of the MED-GOLD ICT platform. A roadmap for release as an open source package will be devised



<b>MED-GOLD unified ICT platform for climate services</b>	5	Validated technological components such as cloud computing, application programming interface (API), and storage technologies will be combined in the ICT platform and validated in the climate service domain.
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MED-GOLD is also based on the idea that replicability of the methodological frameworks for climate services (i.e., reuse the same methodology for developing new climate services) should be ensured at multiple levels.

- **General protocol to co-design climate services.** This is a general and tested protocol<sup>3</sup> for developing climate services that was developed by the FP7 CLIM-RUN<sup>4</sup> project led by ENEA. This protocol adopts a bottom-up approach that entails early and direct involvement of stakeholders in the process of co-designing climate services (a pioneer approach). This overall concept has been also applied in subsequent initiatives (e.g. EUPORIAS). The steps of the protocol will be formalized in the MED-GOLD ICT platform so as to generate standard data that will be easy to compare and reuse. The ICT platform will also greatly help in replicating and scaling up the protocol beyond the boundaries of the MED-GOLD project.
- **Integration of existing tools into new climate services.** Prospective users of climate services may already derive climate-related information from existing tools, and hence there may be a need for integrating such tools into a developing new climate service, with particular reference to data interface, data input/output, metadata, user interface. To achieve this, the MED-GOLD ICT platform will implement an Application Programming Interface that will enable integration of existing tools into the MED-GOLD ICT platform in a seamless fashion at the software/programming level.
- **Further design/feasibility.** MED-GOLD will conduct further replicability tests at the design/feasibility level using the coffee sector in Colombia in collaboration with our Colombian partner UMG. Colombia is a country that borders other countries in Central America, and hence it can play a role in disseminating climate service innovation in that geographical area. In addition, coffee is the world's most important agricultural commodity that is widely grown in Africa and generates trading volumes that are second only to crude oil (Igami, 2015).

**Table 1.3:** International research and innovation activities linked with MED-GOLD

Programme, name and coordinator	Task/activities linked with MED-GOLD
FACCE-JPI, MACSUR, Thünen Institute for Market Analysis ( <a href="http://macsur.eu/">http://macsur.eu/</a> )	Task XC7.2 Providing ensembles of EU-wide/global consistent sets of crop yield changes Task XC7.5. Deepening of the EU-wide analysis with regional/national crop, livestock and economic models (cross-checking results with XC7.4)
AgMIP ( <a href="http://www.agmip.org/">http://www.agmip.org/</a> )	Pest and Disease Model Intercomparison And Improvement Project (PEDIMIP)
OLIVE-MIRACLE, National Research Council, Italy ( <a href="http://facesurplus.org/research-projects/olive-miracle/">http://facesurplus.org/research-projects/olive-miracle/</a> )	All the activities related to expected results 1, 2, 4, 5 and 6.
H2020, EUCLID, Institut National de la Recherche Agronomique (INRA) ( <a href="http://www.euclidipm.org/">http://www.euclidipm.org/</a> )	WP1 - Optimisation and adaptation of current pest management methods

<sup>3</sup> [http://www.climrun.eu/news\\_data/254/d1.1.pdf](http://www.climrun.eu/news_data/254/d1.1.pdf)

<sup>4</sup> [http://cordis.europa.eu/project/rcn/99345\\_en.html](http://cordis.europa.eu/project/rcn/99345_en.html)

ERA-NET ARIMNet2, BacPLANT, Université de Reims Champagne Ardenne ( <a href="http://www.arimnet2.net/index.php/research/projects/projects-2nd-call/bacplant">http://www.arimnet2.net/index.php/research/projects/projects-2nd-call/bacplant</a> )	Objective 2: Breaking up regional and national barriers by endorsing a Mediterranean network for optimal efficiency of multisite experimental trials
LIFE, ADAPT2CLIMA, National Observatory of Athens ( <a href="http://adapt2clima.eu/en/">http://adapt2clima.eu/en/</a> )	C: Use of regional climate models for the projection of future climate conditions C4: Assessment of the vulnerability of agriculture to climate change
C3S AgriCLASS, TelespazioVega	Development of Europe-wide datasets of agro-climatic indicators

**Table 1.4:** Sector specific issues that MED-GOLD will consider at different time scales

Seasonal timescale	Long-term timescale (climate change projections)
<b>Olive/olive oil (WP2):</b> Q2.1 When and where apply pesticides to control the olive fly pest in the next campaign? Q2.2 How much oil will I produce in my farm next campaign? Q2.3 How much oil is going to be produced? Q2.4 When do I have to apply fertilizer in my farm for the next campaign? Q2.5 When do I have to start watering/irrigation in my farms?	<b>Olive/olive oil (WP2):</b> Q2.1 Which will be the average productivity in a certain region in 10 to 20 years? Q2.2 Which new pests will I have to fight against? Q2.3 Will olive trees grow and produce better at higher altitudes/higher latitudes (due to higher temps) Q2.4 Will olive trees have to be planted at a greater distance one from the other in the future (due to drier conditions?) Q2.5 What will be the productivity range in the future period and the climate scenarios (lowest and highest productivity in future period compared to the present) Q2.6 What will be the irrigation requirements in the future?
<b>Grape/wine (WP3):</b> Q3.1 How many pest management spray treatments or distribution are expected for the upcoming Spring / Summer season? Q3.2 What will be the probability that the number of treatments will exceed a specific threshold for the upcoming Spring / Summer months?	<b>Grape/wine (WP3):</b> Q3.1 What vineyard perennial characteristics (variety/scion/rootstock...) will be suitable in a particular area in a 30-year time horizon? Q3.2 How the vulnerability to drought/pathogen will change in a particular area for the next 30 years? Q3.3 Will the suitability of a particular area for the present market recognized wine style (terroir resilience) change over the next 30 years? Q3.4 Is there a risk of losing suitability of a particular area for the presently market recognized wine style (terroir loss)? Q3.5 Is there an opportunity for a particular area to acquire suitability to produce a new wine style (terroir innovation)?
<b>Durum wheat/pasta (WP4):</b> Q4.1 (Producers) What is the expected soil leach during the next crop season? Q4.2 (Producers) How much nitrogen fertilizer will I need to apply? Q4.3 (Producers) What is the expected schedule for the application of fertilizers? Q4.4 (Barilla) What will be the reliability of the local supply chain of durum wheat for the production of pasta? Q4.5 (Barilla) Can we take action to reduce our carbon footprint for the next season?	<b>Durum wheat/pasta (WP4):</b> Q4.1 (Producers) Is any durum wheat variety expected to be more favoured in my climatic area Q4.2 (Barilla) What new areas will be suitable for durum wheat cultivation in the next future? Q4.3 (Barilla) shall we adapt our supply chain in order to reduce our carbon footprint worldwide?

### 1.3.2 Methodology

MED-GOLD is focused on a **systemic and user driven transformation of climate, impact and economic data into information** and knowledge that is able to inform and support users' decision-making in specific pilot services.

These pilot climate services will be co-developed following the same user-centered methodological framework even if with different objectives and structures, reflecting the intrinsic difference of the three MED-GOLD sectors (**olives/olive oil; grape/wine; durum wheat/pasta**). All the pilot services will rely on the ICT MED-GOLD platform.

The **MED-GOLD ICT platform** is a cloud-based infrastructure whose role is to provide a centralised platform to collate basic technological tools for all the pilot services that will be developed during the project. Functionally, there will be three main layers to this platform: the first one will deal with data acquisition, and will be responsible for importing and normalising data from external sources, including Copernicus' CDS climate data, needed for all the pilot services' models, simulations and algorithms. Both the externally acquired data and results computed by the models themselves will be managed by the data storage layer, which will coordinate the storage of data on various different physical backends (e.g.: SQL, Graph representations, Filesystems, Object storage) and will also provide methods to store, search and retrieve stored information. The data output layer, finally, will provide a set of tools, such as APIs and automatic data exports, which will allow communities and applications to be built upon the results of the project.

Each pilot services will deal with specific questions and associated decisions identified with the MED-GOLD industrial partners across different timescales (from seasonal to longer timescales). A coordinated and crosscutting mapping of the overall agricultural sector will allow the consortium to identify, from the outset of the project, the more representative players to be engaged in the MED-GOLD community for the validation and up-scaling of the pilot

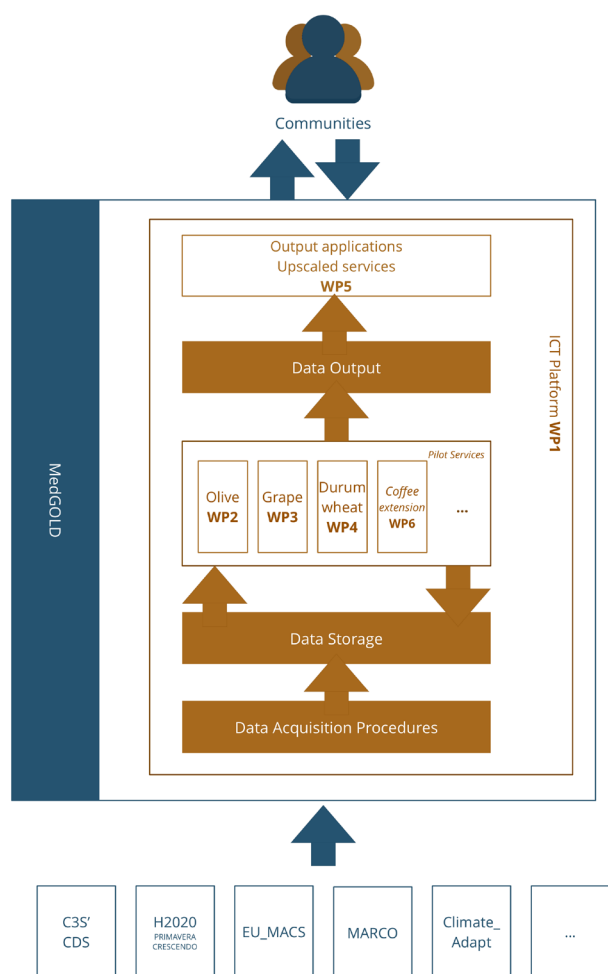


Figure 1.3.2a: MED-GOLD ICT Platform

services. A key aspect in the co-development of the pilot services is to **manage the expectation of end-users**.

A user-driven **common methodological framework** (Figure 1.1) will be adopted to co-develop the MED-GOLD pilot services (WP2-4) for the three main crops of interest. This framework will exploit the knowledge generated under previous initiatives (EU FP7 projects CLIM-RUN and EUPORIAS). In particular, we will follow the climate services protocol initially drafted in CLIM-RUN<sup>5</sup> and add further improvements taking into account more recent initiatives on climate services (EUPORIAS, C3S SECTEUR and all the SISs). The methodological framework is composed of by four steps:

<sup>5</sup> [http://www.climrun.eu/news\\_data/254/d1.1.pdf](http://www.climrun.eu/news_data/254/d1.1.pdf)

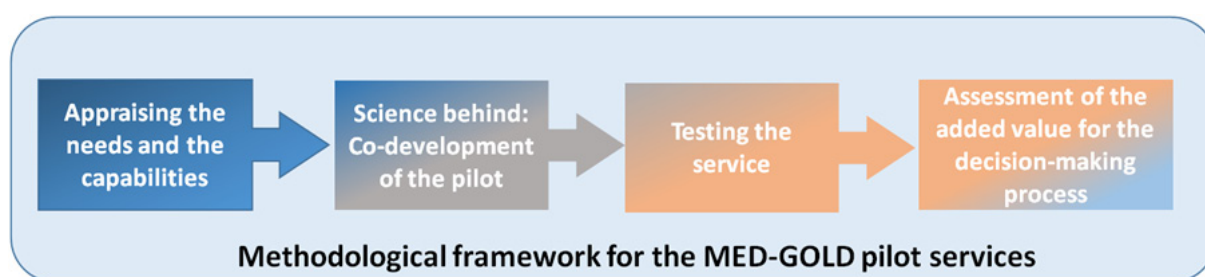


Figure 1.3.2b. The common methodological framework adopted in MED-GOLD for the development of sector specific climate services.

#### **Step 1: Appraising needs and critical decisions for the specific case**

A preliminary analysis of each pilot will be conducted, starting from the specific needs of the industrial partners of MED-GOLD and the assessment of vulnerability and opportunities for each specific MED-GOLD pilot service. Particular attention will be devoted to key decision-making processes that underlie each case, to better identify how and when the outcomes of the pilot services to be developed can better support and inform those decisions.

#### **Step 2: Co-developing the specific service tools**

This step encompasses the production of information and tailoring to the users' needs. The methodological issues for each of the MED-GOLD pilot services will be addressed, collecting the various data required, analysing the climate data of interest from available data stores (e.g. CDS, EURO-SIP, CMIP6) through the ICT platform, with an assessment of the quality of the observational data available along with the skills of climate predictions/projections required for the variables of interest. The pilot services will benefit from the existence of seasonal climate predictions and long-term climate change projections, which allow to anticipate information related to easy or severe years in terms of disease control and related to suitability for establishing a culture in a climate change scenario. The co-design of the pilots started as early as during the project proposal preparation, when a preliminary appraisal user's needs and critical decisions was carried out through a series of physical and virtual meetings involving both user and suppliers.

#### **Step 3: Testing the specific service tools**

In this step, a quantification of the effectiveness of the service will be evaluated by analysing its potential added-value in support of critical decisions during the last decades, with particular attention to critical years for the sectors involved. For the climate service focusing on long-term climate change projections, the evaluation will be based on the producers' expert judgement with regard to the fit for purpose of the service provided and how that addresses their information requirements regarding future risks in farming activities.

#### **Step 4: Assessment of the added value for the decision-making process**

The potential (economic and/or non-economic) value and benefit of climate services to help support and inform decision-making processes will be performed in this final stage of the pilot services development. The value of a climate service to the end-user is dependent on a range of factors (e.g. fit for purpose of the service developed within the user's organizational context, the timeliness of the service provided, the ability of the user to act upon the new tool, the benefits of using the new tool to support the decisions at hand) (Bruno Soares et al., forthcoming). As such, a range of methodological approaches will be adopted to assess the value of the climate services developed which can range from the more quantitative methods such as decision-based theory models to the more qualitative and participatory methods although, as these are not mutually exclusive, this type of assessments tend to include aspects that are both qualitative and quantitative in nature (Bruno Soares et al., forthcoming; Clements et al., 2013).

All the main outcomes will be reported to the MED-GOLD end-users community, where a significant sample of the main players, not directly involved in the pilot services, of the three MED-GOLD sectors will be engaged since the beginning of the project and continuously updated and informed on the steps forward of the pilot and on the methodological framework adopted (WP5). The existing networks can act as entry points to their communities of users. Drivers related to economy and technology to achieve end user behavioural change will be applied. **Building trust** over time into the project community will facilitate the future roll-out strategy to discuss the pilot services developed for the three sectors within the MED-GOLD community. This will allow MED-GOLD to **validate the services** and to explore their potential applicability and upscaling in the wider community.

## Gender Analysis

The institutions involved in MED-GOLD adhere to the principles stated in the European Charter and Code for Researchers and apply the Non-discrimination Principle: *“Employers and/or funders of researchers will not discriminate against researchers in any way on the basis of gender, age, ethnic, national or social origin, religion or belief, sexual orientation, language, disability, political opinion, social or economic condition”*<sup>6</sup> and Gender Balance: *“Employers and/or funders should aim for a representative gender balance at all levels of staff, including at supervisory and managerial level. This should be achieved on the basis of an equal opportunity policy at recruitment and at the subsequent career stages without, however, taking precedence over quality and competence criteria. To ensure equal treatment, selection and evaluation committees should have an adequate gender balance”*<sup>1</sup>. For example, the University of Leeds as an Equality and Inclusion Framework 2014-2019 whose aim is to set the strategic vision and delivery mechanisms to adequately embed and monitor equality and gender issues across the institutional setting.

Additionally, MED-GOLD will promote gender equality to the largest possible extent. It will give preference to female individuals if equal qualifications prevail among potential candidates or beneficiaries of activities (e.g., selection for involvement in training programmes, etc.). We believe that gender equality issue is even more important given the technological focus of the project. For this reason, in case of choice among staff with equal qualification preferences will be given to female in order to address traditional inequities and achieve the best possible balance among the user group.

Dealing with gender issues must not only be limited to promotion of women within the MED-GOLD staff, but also promoting better relationships between genders, division of responsibilities and resources between genders as well as implication of work within people's private life. To this extent, opportunities for part-time working will be fostered as well as remote work from home will be advocated whenever this could be appropriate, for instance in case of maternities.

## 1.4 Ambition

### 1.4.1 Progress beyond the state of the art

MED-GOLD build on the outcomes of past recent European experiences on climate services (CIRCE, CLIM-RUN, ECLISE, IMPACT2C, EUPORIAS, SPECS).

CIRCE and IMPACT2C have adopted an integrated approach to the assessment of cross-sectoral impacts of climate change on human activities in Europe.

CLIM-RUN and ECLISE were focused on the engagement of stakeholders for the tailoring of climate data into sectoral information but with a limited attention devoted to the decision-making process and to the piloting of real services.

SPECS has provided a systematic assessment on the skills of climate predictions from seasonal to decadal time scale.

EUPORIAS was instead more focused on the assessment of sector-specific vulnerabilities and on the development of prototypes for climate services. This experience has highlighted that the non-systematic involvement of problem-holders in the prototypes is a sub-optimal situation that could hamper the overall effectiveness of a climate service.

Building on those past experiences, the ambition of MED-GOLD is to create a new paradigm of climate informed decision-making processes within the agri-food chain. The example of the MED-GOLD industrial partners will be used as an example of best practice to catalyze the interest on climate services and stimulate the demand within the MED-GOLD community of users. Ultimately, the ambition of MED-GOLD is to reach the wider European agricultural sector and the society at large.

This high-level ambition encloses more specific ambitions of the three MED-GOLD pilot services on grape/wine; olives/olive oil; durum wheat/pasta.

<sup>6</sup> “The European Charter and Code for Researchers”, <http://ec.europa.eu/research/era/docs/en/areas-of-action-research-institutions-european-charter-2005.pdf>



### 1.4.2 Innovation potential within the selected application sectors

#### **Grape/wine.**

In the wine sector, there is a well established notion that a wine's quality is inextricably linked to the environment of its production, including soil, climate, topography, and the history and culture of a place (Charters, 2006).

Climate is arguably the most important determining factor of the quality of wine for any given grapevine variety. Climate change is impacting wine production in all parts of the world in highly variable, from rapid loss of viability right through to highly beneficial aspects that increase suitability. An example at one end of such impact is the recent expansions in wine production in the United Kingdom and Denmark, where previously the climate was relatively inhospitable for wine grape growing.

If the wine industry in any part of the world wishes to survive and thrive in the future, it will need to adapt to the challenges of climate change. Under a changing or changed climate it will be important for individual producers to decide whether 'business as usual' remains a viable and sustainable option, or if changing their style of wine will allow for improved value through maintaining and enhancing consumer perception of the new quality of wine (Gishen et al., 2016).

MED-GOLD will develop climate service prototypes that will assist wine businesses in managing risk within the framework of their medium- and long-term business strategies. Two important activities in winegrowing will be targeted: (i) Spring grapevine protection against diseases and pests, whose planning will be benefited by the availability of seasonal forecasts with appropriate temporal and spatial resolutions and (ii) plantation of a new vineyard, whose structural choices of site, density of plantation, training system, requirement for irrigation, scion and rootstock varieties, among others, will profit from the existence of long-term predictions allowing to anticipate, several decades into the future, climatic factors conditioning its profitability.

MED-GOLD will also address the need to provide users with clear, straightforward, inclusive and universal indicators for uncertainty allowing wine industry managers to quickly assess whether forecasts and predictions are relevant and require action under their chosen risk-management stance and strategy. For the first time, it will be possible to have objective integration of climate information into the decisional process of grape and wine business, increasing its efficiency and sustainability, ultimately resulting in enhanced resilience.

By becoming a climate-aware industry, the wine sector will boost its reputational image as a heritage guardian that not just conserves its tradition but also projects it into the future with value gains and setting innovations that will become the future's traditions.

#### **Olive/olive oil.**

Olive (*Olea europaea* L.) is one of the major fruit tree crops in Mediterranean countries (Loumou and Giourga 2003). The European Union is the largest producer of olive oil in the world. This situation could be transformed due to climate change, the increase in olive tree plantations in other countries and pest problems such as olive fruit fly.

MED-GOLD will provide a climate service that will predict the effects of climate change. In this sense, it will also be able to predict the influence of pests and olive production in future campaigns. As a result, the European Union will have the tools to maintain its position as the world's leading producer of olive and olive oil.

To achieve this goal, this climate service will become an integrated tool for, on the one hand, its use by farmers in making critical decisions in the field. In recent years there has been a growing interest in integrated pest management. It is well known that in most of the *Olea europaea* producing areas, the fruit fly of the *Bactrocera oleae* olive tree is considered the main biotic threat for crops (Tzanakakis, 2006). MED-GOLD will design models capable of predicting pest dynamics. In this sense, the pilot will support the management of these pests or reduce agricultural costs (for example, irrigation control, fertilization and pesticides).

On the other hand, on a longer time scale, the pilot will help with decision making and the overall strategy, through improving climate information, and estimating yields and production. As a result, MED-GOLD will allow better productions and final products of higher quality (e.g., its well known that olive fly pest affects to chemical as well as organoleptic quality parameters). This will provide a competitive advantage in relation to emerging producer countries and an added value for end consumers.

#### **Durum wheat/pasta.**

Durum wheat yield and technological quality (standard weight and protein content) are strongly affected by weather conditions. It is also well known that nitrogen fertilizers are an important component in the calculation of air emissions (GHG) and that such emissions are much lower when nitrogen fertilizers show greater efficiency. For example, at the end of rainy winters favoring nitrogen loss by leach into the ground water, plants are strongly stressed, because of lack of nutrients. The amount of nitrogen fertilizer, the nitrogen form (urea, ammonium nitrate,

nitrogen slow release and use of inhibitors, etc.) and distribution schedules, can therefore be radically different in relation to seasonal weather. Currently, producers have no access to information that can support an optimal use of input to their farming activities. The most important ambition of MED-GOLD for the durum wheat pilot is to provide, for the first time, critical information supporting the definition of the most adequate fertilization strategy, in each specific crop situation.

This set of tools, therefore, concretely allows farming techniques adaptation to climate change, leading also to positive effects on the economic attractiveness of the crop, the Nitrogen Use Efficiency (NUE) and kernels' protein content.

Ultimately, MED-GOLD will produce innovations in the durum wheat cultivation that will allow processing industries (e.g. Barilla, who get the chance of purchasing durum wheat obtained with lower environmental impact) to improve overall pasta products' performance in terms of sustainability targets, in line with the company mission of Barilla '*good for you, good for the planet, good for the communities*'.

## 2. Impact

### 2.1 Expected impacts

**Work Programme (expected impacts):** *providing added-value for the decision-making process addressed by the project, in terms of effectiveness, value creation, optimised opportunities and minimised risk*

**MED-GOLD Contribution:** Supply of predictions focusing on two very important phases of the agri-food value chain, involvement of in their creation right from the beginning, MED-GOLD will address the ambition of deploying climate services, not only well in tune with the needs of the industry, but also under formats readily understandable, useful and consequential for decision-making by business and technical managers.

**Indicators:**

- Cost reduction against current situation
  - A qualitative user rating about the perceived usefulness of the service, from End-User will be useful as well
- (Related tasks T2.4, T3.4, T4.4)

**Work Programme (expected impacts):** *enhancing the potential for market uptake of climate services demonstrated by addressing the added value*

**MED-GOLD Contribution:** Demonstration of the possibility to deploy existing climate knowledge as user-centered climate services which are easy to integrate and able to add value for a global and relevant economic sector as the grape to wine value chain, durum wheat and olive oil. MED-GOLD will provide evidence that these services have the potential to positively impact any other farm-based value chain whose value is conditioned by climate and its variation. Crops such as coffee, cocoa, tea are the natural bleed over from MED-GOLD but others, such as biofuel, oil and protein crops or even forest species can benefit from the insights, developments and innovations MED-GOLD proposes to make climate information more readily usable and value oriented. A set of public user-experience workshops and publications are planned under WP6 focusing sectors not considered in MED-GOLD.

**Indicators:**

- Number of sectors where the developed services have demonstrated a potential positive impact
  - Number of public workshops
- (Related tasks: T6.2)

**Work Programme (expected impacts):** *ensuring the replicability of the methodological frameworks for value added climate services in potential end-user markets*

**MED-GOLD Contribution:** MED-GOLD will develop a common framework for user-centered and value-adding climate services for the three sectors considered in the project (wine, olive oil and pasta). That common framework will be composed of tools that being usable across those three sectors, may also be deployed on other sectors that rely on farming and even on forest species. Multiple actions, in WP5, are planned to disseminate MED-GOLD

results and raise awareness to the highest possible extent in the three sectors considered by the project. In WP6, a set of public user-experience workshops and publications are also planned to extend awareness of MED-GOLD framework to other sectors.

**Indicators:**

- Number of cases where the developed framework is deployed and applied

(Related tasks: T5.2, T5.3, T6.2)

**Work Programme (expected impacts):** *Promoting a better informed and connected end-user community; implementing the Sustainable Development Goals (SDGs), in particular SDG 13 'Take urgent action to combat climate change and its impacts', as well as the conclusions of the COP21 Paris Agreement*

**MED-GOLD Contribution:** Activities planned for WP5 and WP6 are meant to enhance knowledge-sharing, user-experiences and best practices across a wide community that may potentially benefit from MED-GOLD proposed framework for climate services. Raising awareness to potential efficiency gains from integration of climate information in business processes, deploying climate services that are easy-to-use-and-understand and providing tools to objectively manage risk in managerial and strategic decision-making will, in turn, will support sustainable development and contribute towards achieving SDGs. In particular, SDG 13 will be directly addressed by MED-GOLD's contribution towards mitigation of climate change through incorporation of climate-based business strategic and tactical planning. MED-GOLD will also contribute for COP21 Paris Agreement conclusions implementations by creating indicators for risk management that will make clear the potential disruptions and loss of resilience for farm-based businesses of continuing global warming above COP21 agreed levels.

**Indicators:**

- Number of indicators for risk management taken into account

(Related tasks: T5.1, T6.3)

### 2.1.1 Other impacts

**Reduced and more efficient use of pesticides, with consequent decreased overall environmental impact of pest management.** By 2050 it is thought that there will be an extra 3 billion people to feed, while agriculture will likely have to face increased numbers and types of pests with less predictable behaviours and migratory range, due to more variable climate change factors (Birch et al., 2011). With mandatory integrated pest management (IPM) in the EU since 2014<sup>7</sup>, this challenge will have to be tackled by replacing pesticide inputs with knowledge and management inputs, especially holistic knowledge on how crop-pest systems respond to climate variability and change. Climate services developed under MED-GOLD will be important in tackling this challenge, building on and complementing recent previous EU efforts such as the PURE project (Pesticide Use-and-risk Reduction in European farming systems with Integrated Pest Management) (Lescourret 2016).

### 2.1.2 Barriers and obstacles

MED-GOLD is an ambitious project and aims to develop a set of climate services, which will improve the management of crops in three key sectors in Europe through the state-of-art climate information tailored for the specific users' needs. In this respect, the main barriers and obstacles in order to achieve the expected impacts is the slow acceptance of climate service for end-users. The proposed actions to overcome it is the demonstration, through the three services co-developed with the champions, of how the climate service can help and improve the decision-making with the production, yield, quality and pests. Those results will be extensively disseminated and communicated to the potential end-users. Moreover, MED-GOLD will promote international cooperation of multiple agricultural sectors, not only limited to grapes, olives and durum wheat.

## 2.2 Measures to maximise impact

One of the ambitious targets of MED-GOLD is the promotion of a more climate-informed community for the European agriculture sector, with a specific attention to the three main sectors addressed by this proposal. To reach this target, MED-GOLD put emphasis on the activities to engage the community and communicate the MED-GOLD results. Three different type of activities are planned during the duration of the project:

- Dissemination activities: the outcomes of MED-GOLD are disseminated by appropriate means, from the website to the attendance to international conferences.

<sup>7</sup> [https://ec.europa.eu/food/plant/pesticides/sustainable\\_use\\_pesticides\\_en/](https://ec.europa.eu/food/plant/pesticides/sustainable_use_pesticides_en/)



- Communication activities: customised information to the target audiences with the aim to engage the communities and promote the action.
- Exploitation activities: measures to foster the development of services and products based on the project's outcomes and also using them in further research activities

### 2.2.1 Dissemination and Communication activities

Dissemination activities will be identified for distributing the results of MED-GOLD, while Communication activities will be established for informing the stakeholders even if not directly engaged in the MED-GOLD Community (WP5-WP6) and the public about the project. All partners will be involved in dissemination and communication. The main objectives of the Dissemination and Communication activities are established to have the largest impact on stakeholders, ensuring that:

- Knowledge and information generated by the project will be available to all interested stakeholder and the public at large.
- Excellent elements of the project outcomes may be replicated at different levels (from local to European) even beyond the agricultural sector.
- Educational contents will be widely spread through specific educational events.
- Collaborations with other active H2020 projects and C3S tenders will be effectively established.

### 2.2.2 Overview

**MED-GOLD will demonstrate a high level of innovation** co-developing with end-users climate services for the current challenges of olive, grape and durum wheat crops face to climate variability and change. It will focus on building the MED-GOLD community first around those crops stakeholders and then beyond them with the aim **to develop business opportunities in line with the concept of commercialization such services**. Thus, **stakeholders** are grouped in: 1) those associated with olive, grape and durum wheat crops sector; 2) those associated with other crops and even other sectors related to the bio-economy market (i.e. forestry, livestock, fisheries).

Therefore, the dissemination strategy will allow creating the needed awareness in the MED-GOLD core communities — olive, grape and durum wheat — to reach stakeholders engagement and facilitates later the adoption from other bio-economy communities — forestry, livestock, fisheries — even beyond the project lifetime as results of MED-GOLD core end-users success stories.

This document presents the key elements of the plan: organizational aspects, types of dissemination and exploitation activities to the different audiences, responsibilities, and timing.

Their effectiveness measures, which will be assessed by specific indicators, will be linked to the expected impact of the project; such indicators will be monitored along the project duration and reported into the annual project report.

Moreover, it defines the right strategy for knowledge management and protection including its priorities versus dissemination in order to avoid any limitation of the expected future results commercialization. Exploitation of the MED-GOLD value chain is outlined with the identification of the involved project partners.

#### 2.2.2.1 The Dissemination and Communication Plan

The strategy for the dissemination and communication will be contained in the WP7 deliverable (D7.3), that will guide the project's and partners' activities to maximize the impact of project's results. These documents will identify key elements of the dissemination and communication strategy, which include the audience targeted, the key messages to be conveyed, the tools and channels employed and the timing of the planned activities.

Dissemination is chiefly aimed at peers, usually professionals and technical experts working in the same area of interest, while communication is aimed at non-specialists, including stakeholders at large whose interest is the potential application of the results and its benefits at environmental, social and economic level. A detailed D&C Plan will be developed, approved by the consortium, and updated (taking into account relevant project findings and outcomes, e.g. results of real testing activities) at least once along the project duration (WP7).

#### 2.2.2.2 Target groups

From the beginning of the project, a target stakeholder community will be constructed. Throughout the duration of the project, this community will be informed, engaged, and invited to events. The engagement of relevant stakeholders identified as the potential adopters of the project results will maximize the success probability of the exploitation activities. The following target groups have been identified:

- MED-GOLD core end-users, who already have experience with such services, independently on whether they are academic or industrial users.
- Other sector specific end-users and stakeholders even beyond MED-GOLD chosen sectors either private or institutional ones.
- Related European collaborative research projects and other European initiatives (i.e. JPI, ERANETs) that offers networking opportunities
- Academic researchers in the areas of Information and Communications Technologies (ICT), climatology and other vertical domains.
- European policy makers and associated EU Expert Groups who have a strong impact on the evolution of EU climate services for agriculture and other sectors, from professional consortium leaders to EC representatives, as well as national research and industry decision makers.
- Standardisation bodies to influence on climate information related working groups.
- Local, national and international media for a professional delivery to the general public.

### 2.2.2.3 Dissemination activities

Communication is essential to disseminate the outcomes of the project. The following communication measures will be adopted, always according to state-of-the-art communication tools:

- **Set up of a webpage:** As one of the first activities, a web page will be set up, which will be used as a way of promoting the research results, as well as providing information to the interested community (WP6). Public deliverables will be made available on this webpage for downloads. Also, active participation in dedicated information and discussion forums in professional social networks will be considered. Finally, presentations and whitepapers will also be actively promoted in those specialised networks and made available at selected platforms, e.g. Slideshare.com ([www.slideshare.com](http://www.slideshare.com)).
- **Intranet platform to facilitate the work-flow between MED-GOLD partners:** The intranet platform developed in WP7 will allow partners to access the technical project follow-ups as well as the project archives via the services provided on the secure intranet section. The platform can also be used, linked to the main webpage, to provide ad hoc access to documents and project results to specific users.
- **Public lectures & demonstrations:** given by scientists, for providing the audience with their scientific insights and excitement with theoretical and practical demonstrations.
- **Journal and International Conferences publications:** The achieved scientific results will be published in leading scientific Open Access Journals. Most of the partners are well experienced with peer-reviewed publications. These publications allow the circulation of knowledge to key target groups such as industry, academia and the public. Produced datasets will be made available in open data public repositories (e.g. Zenodo)
- **Workshops:** participatory workshops will be delivered at important points during the development of the services. They will be an efficient platform to better understand the needs of the agricultural sectors involved and also for the project results dissemination. At least six workshops, two for each sector, will be organised during the entire duration of the project.
- **Participation in sectoral exhibitions and related EU events:** The project will participate in renowned exhibitions and related EU events in order to draw the interest of the agricultural main players as well as raising awareness within the wider community, to trial partners, demonstrate innovative ideas turned into prototypes and raise awareness of its activities. A preliminary list would include the SwitchMed Connect event, the International Fair of Olive Oil and Allied Industries, AHDB Grain Market Outlook, Salon de l'Agriculture Connectée, International Equipment And Expertise Exhibition for The Vine-wine, Olive, Fruit-vegetable Productions, Intervitis Interfructa Hortitechnica
- **Training:** Capacity building has been recognised as a key enabler for targeted dissemination and exploitation of project results. Therefore, several partners will prepare a "training package" with a clear link to the use of the climate information in the MED-GOLD sectors, organising a series of training events (for early career scientists and professional), seminars and workshops, at different locations, for interested experts and stakeholders in the framework of WP5 and WP6 activities
- **Participatory activities and Social Media.** part of the engagement strategy relies on the use of web-based interaction tools and social networks. A web conferencing platform will be set up to be able to organise webinars with up to 1000 participants. Furthermore, social media tools like YouTube, Twitter and Facebook

will be used for the dissemination of the results and, moreover, the live report of events like the main assemblies or the most important events.

#### 2.2.2.4 Communication activities

Communication is aimed at the public at large through an iterative, interactive and multidirectional process involving a wider range of stakeholders and the citizens. Communication aims at achieving uptake and stimulating activities such as: end-users becoming aware of, accessing and applying project tools, creating an enabling environment by mobilising intermediaries, knowledge brokers and the media to contextualise and connect project outcomes with end-users in policy and practice. The project's communication activities have been divided between the internal communication and the external communication, the latter aiming to promote the project and raise its visibility to a wide audience ensuring that the project value creation reaches the potential end-users and its results encourage European players and society to achieve further user and advancements.

To this end, the communication activities will necessarily focus on a few key headlines outlining the project's results, transforming sometimes complex technical jargon into customized messages aiming at less specialised audiences. The selection of communication tools will rely on the type of targeted audience, already identified in the dissemination section above. Both communication and dissemination activities will be coordinated to enhance the public visibility of the project.

The main objectives of the Communication activities are established to have the largest impact on stakeholders, ensuring that:

- Knowledge and information generated by the project will be available to all interested stakeholder and the public at large.
- Excellent elements of the project outcomes may be replicated at different levels (from local to European and even global)
- Educational contents will be widely spread through specific educational events (i.e. summer courses).
- Collaborations with other active H2020 initiatives will be effectively established.

Communication can take many forms, from non-participatory one-way communication to fully participatory reaching stakeholders' engagement. MED-GOLD emphasizes the importance of stakeholder engagement as a critical component of communication as a tool supporting market take-up replication.

The overall MED-GOLD communication strategy is provided from WP1 and will be mainly implemented in WP5 and WP6, for MED-GOLD core communities and beyond respectively.

The proposed communication actions for promoting MED-GOLD and its findings during the project duration are outlined in the Table 2.2.2.4a.

**Table 2.2.2.4a**

Communication Aim	Message	Actions
<b>Awareness</b>	Climate services potential face to climate change risks to agriculture production.	<ul style="list-style-type: none"> <li>• Public web and social media</li> <li>• Communication material (hand-outs, newsletters, brochures, posters, photos, videos, webinars, maps, national/local TV/radio interviews, etc.).</li> <li>• Ph.D summer courses promotion with open and non-specialized educational materials.</li> </ul>
<b>Engagement</b>	Quality and relevance of climate services for both short and long term decision making.	<ul style="list-style-type: none"> <li>• Public web</li> <li>• Effectiveness of project achievements oriented material such as End-Users success experiences (hand-outs, general audience articles, press releases, stakeholders workshops, etc.).</li> <li>• Open access peer-reviewed international publications on validation results.</li> <li>• Presentations in international conferences and tradeshow.</li> <li>• Expansion of project results into global networks through Advisory Board members.</li> <li>• Contributions to standards on quality of climate services.</li> <li>• Policy-making recommendations.</li> </ul>

<b>Adoption</b>	Added value of climate services.	<ul style="list-style-type: none"> <li>• Public web</li> <li>• Active presence in the identified sectors tradeshows to share adoption experiences to increase the potential users base.</li> <li>• Benefits oriented material (hand-outs, educational papers, press releases, newsletters, brochures, articles, posters, photos, videos, webinars, maps, national/local TV/radio interviews, policy briefs, etc.) from End-Users success cases.</li> <li>• Open access peer-reviewed international publications on experience reports, guidelines or lessons learned.</li> <li>• Validation results presentations in international conferences.</li> <li>• Stakeholders' educational training, presentations in congresses, project demonstration workshops and on-line and on-site summer courses.</li> <li>• Contributions to standards on quality of climate services.</li> <li>• Policy-making recommendations.</li> </ul>
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Concrete message and communication format will be customized to the intended audience which embraces a wide variety: agriculture sector producers companies planning and operations managers, any interested sector associations, scientists, researchers, social networks and EU officers.

#### 2.2.2.5 Key Performance Indicators of dissemination and communication

In order to ensure that the dissemination strategy objectives are achieved, the project team has identified a number of Key Performance Indicators (KPIs) against which the Dissemination & Communication Plan will be implemented. They have been outlined in Table 2.2.2.5a.

**Table 2.2.2.5a. KPIs for Dissemination and Communication**

Item	KPI and target value
MED-GOLD website	About 5,000 user sessions per year (data to be collected through Google analytics or similar systems). The website will be maintained for at least one year after the termination of the project.
Stakeholders' database	A list of about 500 stakeholders involved in agrifood-related domains, policy- and decision makers, academia, regional/local authorities, industry, investors, etc.
eNewsletters and contents (articles, press releases, infosheets)	Two eNewsletter released per year targeting a community of 500 stakeholders (to be reached at the end of the project). Distribution of at least 6 press and news releases and at least 4 articles/interviews to the general and specialised media, portals, blogs and promoted via social media with hundreds take-ups each. Six infosheets available on the website, distributed via social media and through 1-to-1 direct mailing to the specific target groups. At least 4 journalistic articles/interviews.
Handout materials	MED-GOLD flyer and e-handbook will be both browsable through the website and available in printable format for public download. The flyer in English and in local languages will be printed and distributed during the events.
Participation in conferences	MED-GOLD will target the participation in 10 major international conferences events (fairs, conferences, exhibitions, etc.) in the course of the project.
Events (online & off-line)	3 webinars will be organised. Expected participants: minimum 30 per webinar. Organisation of a final event with stakeholders (format to be decided) at the end of the project to present the project's results.
Use of partners' network	MED-GOLD will take advantage of the partners' existing communication channels and networks to disseminate and communicate its results. Examples are the partners'

	newsletters, their websites and platforms, their social media accounts and magazines. Outreach: 2000-3000 users
Mobilization of Stakeholder Associations, support from the Advisory Board members and other EU projects and initiatives	Associations provide direct communication channels into the target groups the MED-GOLD is trying to penetrate. These include all the associations and initiatives the partners are members of, as well as the members of the Advisory Board. Besides that, other EU initiatives providing communication support to EU funded projects as well as other EU funded projects will be approached to exploit synergies and jointly organized actions.
Scientific/technical publications	The target is 10 scientific papers in high impact journals, and 10 scientific papers in high-reputation International Conferences.

Finally, participation in standardization and industrial working groups will play a key role, since influencing a standard means a huge impact of MED-GOLD results on the market. Liaisons with specific standardization/industrial organizations will be established in order to influence decision makers.

### 2.2.3 Exploitation plan

The exploitation plan ensures that the results of MED-GOLD will create the opportunity to marketing innovative products and services, promote new research and support policy making.

The entire value chain for climate services in agriculture is represented in the MED -GOLD consortium. Businesses in the three sectors (olives, grapes and durum with) will benefit from the projects' innovations that support the planning of optimized climate risk management strategies. Service providers in the consortium will acquire new tools for their customers (WP2, WP3, WP4). New opportunities for the development of Infrastructure as a Service (IaaS) will be created under MED-GOLD (WP1). The need for better informed policy making at the EU level is also a target of MED-GOLD with a specific focus on the implementation of the Sustainable Development Goals (WP6).

MED-GOLD targets the problem of improving medium to long-term planning of climate risk management strategies in the agricultural sector where the available resources are still, to a large extent, informal and fragmented. On the contrary, MED-GOLD will work towards the standardization of tools and methodologies (WP1).

An Intellectual Property Ownership framework has been drafted and will be finalized in the grant agreement. This will allow the partners of MED-GOLD to exploit the results of the project beyond its duration. In particular, new tools for the exploitation of public data stores and for the production of tailored information for the agricultural sector will be created in MED-GOLD.

The potential market for the services developed in MED-GOLD has a global reach and has the largest share of both producers and consumers in the Mediterranean area.

Specific actions, and the associated budget, have been planned in MED-GOLD to engage with a community of potential users (WP5) to disseminate the results of the project (WP6) and to analyse the components of a sound business model that would allow climate services to work in a commercial and competitive environment (Task 6.2)

The showcasing of key stakeholders' experience in a high-level workshop to be possibly held at FAO or EU DG-AGRI premises will aim to share success stories and cross-fertilise among the different sectors considered in the project (WP6).

Table 2.2.3a provides a detailed exploitation plan for each partner of MED-GOLD. The exploitation of MED-GOLD outcomes by the different partners will be presented in detail in the annual project exploitation plan (yearly updated). In this document, industrial partners will present among others, for their core markets, the development perspectives in terms of application scenarios, market expected size and the schedule to address these applications.

**Table 2.2.3a Individual partner exploitation plans and expectations**

Partner	Exploitation plan
ENEA	The goal of ENEA is to consolidate its lead role as a pioneer in the field of climate services and establish a network for climate services in key agricultural sectors for Italy, thereby fulfilling its duty as the National Agency for Sustainable Economic Development. In particular, the the oucomes of MED-GOLD will contribute to the knowledge base of the Centre for the Advanced Services for the Agro-industry (CSAgri), in which ENEA plays a pivotal role.
BARILLA	The aim of Barilla is to (1) incorporate the results in the operational system of yield forecasting and crop cultivation strategies in JRC, DSS-granoduro.net® and Delphi models and 2) Develop a business plan to promote the capitalisation of the results and to facilitate the application of the developed technologies at farms, storage facilities and milling plants;
Beetobit	BeeToBit is interested in developing and maintaining large-scale cloud infrastructures for scientific data; they intend to use the know-how and technologies developed through the course of the project to build IaaS products targeted both at research institutions and companies in the agricultural sector.
BSC	The BSC plans to extend the use of the MEDGOLD climate service tool, with probabilistic seasonal predictions and climatic indicators, to ensure the efficient uptake of the climate information product by the wine, olive oil and durum industry. It will be open source and all the scripts and related documentation on how to use the tool will be made readily available for the interested users.
CNR	CNR will prepare the ground for further innovative exploitation of seasonal forecasts data in scientific activities by providing methodologies to obtain high accuracy and robust data products. A comprehensive evaluation of durum wheat yield simulations with various seasonal climate data will open up for new scientific applications in agriculture as well as point to mainstreaming the use of seasonal forecasts in application areas where the use has been limited, due to uncertainties and scale mismatch.
DCOOP	DCOOP Group aims to improve the range of services that are already offered to farmers and cooperatives. The technicians of the Group will improve their advise on productive practices as a result of the information provided by the climate models, such as the correct time of harvesting of the olive fruits in each season, the most appropriate treatment to prevent pests, soil management for the optimization of cultivation in each climatic season, etc.
GMV	MED-GOLD's prototyped climate services are expected to bring interesting new features to GMV's suite of products/services for worldwide agriculture stakeholders. GMV is interested in MED-GOLD's climate services tailoring not only in Europe but also in different regions such as South America and Africa. Moreover, GMV will study project results' feasibility for MED-GOLD's core crops and others such as coffee, soybean, corn, cotton and sugarcane. Eventually, GMV will be open to discuss collaboration agreements with MED-GOLD's partners to further develop and/or exploit the project results beyond MED-GOLD termination.
JRC	The participation of JRC to the proposal will foster the innovation of its agro-climatic modelling system and it will give the opportunity to achieve a better and more efficient integration of climate products into the current systems used for seasonal forecasting and climate change agricultural impact assessments. This will contribute to provide more robust, reliable and consistent evidences for the agro-climatic policy support of JRC, e.g. for the Common Agricultural Policy and the EU Adaptation Strategy.
Met Office	The Met Office aims to increase its knowledge of climatic and bioclimatic indicators which are the most useful for producers. Areas where models are/are not skilful at forecasting and simulating these indicators would be identified. Knowledge from MED-GOLD will feed into core research activities, specifically development of the crop simulation module within the JULES land surface model.
NOA	NOA is planning to organize a workshop per each pilot service targeting appropriate audience including the public and private sector with the aim to demonstrate the tools developed in MED-



	GOLD. The public sector will be Ministerial Departments responsible for forming agricultural policies whereas the private sector will involve executives from large and medium enterprises linked to the pilot services as well as NGOs. NOA will also exploit traditional routes for project disseminations of results such as presentations in major national and international conferences and events.
SOGRAPE	MED-GOLD will provide SOGRAPE with the capacity to improve and develop usage of climate information for its decision-making process in viticulture. SOGRAPE plans to use the service prototypes to be developed in the project, as they become commercially-available, to improve its strategic planning for new vineyards to be planted and to evaluate, with higher precision, the investment case for planting vineyards in any given location. Those services will allow for a better choice of grapevine varieties, rootstocks, training systems, plant protection strategies, irrigation needs, vineyard logistics and potential wine styles to be produced. The communication of these skills inside and outside the organization will be used as a tool to identify other critical processes in the company's value-chain potentially improvable with better climate information, as it becomes available.
UniLeeds	The Uni Leeds will exploit the results of MED-GOLD through the publication of peer-review articles and by presenting the outcomes of MED-GOLD at international conferences.
UTH	MED-GOLD results will be used in shaping the curricula of graduate and undergraduate studies of partner education institutes, by introducing new courses related to network applications, and by adding state-of-the-art cutting-edge material on already existing courses. UTH will be active in disseminating project results in terms of publications and standardization work and in providing expertise to the research community. The cooperation with industrial partners will be exploited to give more concreteness to their academic research and to acquire practical experience, especially through the development of the testbeds within other user communities.

### 2.2.4 MED-GOLD Business Plan

During the execution of MED-GOLD, there is a precise responsibility assigned to GMV to define market models, business models and business cases for the up-take of the market based upon a quantitative evaluation of benefits, capitals and operational costs for the various stakeholders in the system (Task 6.6).

The consortium will further exploit the results of the project towards its deployment and sustainability. The following issues will be discussed and further developed in order to support its sustainability.

A major risk today for climate service market establishment is the lack of demonstration of benefits that those climate services can generate to stakeholders, considering that they are private corporations whose main aim is to increase their profits. **MED-GOLD will mitigate this market risk through engagement of stakeholders and dissemination of the benefits to integrate the climate dimension in the stakeholder planning and operational processes.** MED-GOLD will provide climate services providers the opportunity to plan the roll-out of their climate service offers with a clearer view on sales growth and market share. And possible charging policies. The Business plan will include:

- **Competitive Market analysis:** All consortium members will perform a continuous market and research watch in order to early identify the state of the art in this project targeted scientific field as well as to constantly be aware of the market/research trends in the project area and the roadmaps of large industrials and international organizations. The competitive analysis conclusions will be reported.
- **Application analysis & Business Exploitation Roadmap:** MED-GOLD needs to have a clear view of the fast evolving sector that will allow its consortium to reposition the current project in its likely market and better align the targeted specifications of the developed technology platform, in other words adapt the product-project-market fit. In this effort, the consortium partners will collaborate with stakeholders to give answers to their feedback and expectations refining identified business opportunities or identifying new ones.
- **Technology transfer actions:** MED-GOLD will actively contribute to **international standardization and product commercialization activities** addressing topics related to the relevant project areas. Several key partners from the consortium participate in standardization committees and fora and hence can provide useful background information on the ongoing standardization efforts in topics related to MED-GOLD activities. Therefore, within this task the consortium will:

- Monitor the activities of related work performed by recognized standardization bodies within Europe and worldwide, and direct the efforts of MED-GOLD. This will ensure the alignment of the project technical work with standards' evolution and progress.
- Identify standardization activities where MED-GOLD can potentially submit proposals based on the project's technology outcomes and to prepare the respective material to be presented, after being approved by the partners.
- Organization of various industry groups and technical meet-ups, where MED-GOLD outputs will be analysed and will be examined for product commercialization
- Creation of a specific Technical Group, that will lead MED-GOLD dissemination in the industry market for enhancing exploitation from the 1st year
- Creation of an External Advisor Group, to guide the project execution and link the outcomes with the industry and commercialization

### 2.2.5 Data management and Open Access

MED-GOLD will mainly use **primary data** collected during the project innovation activities; the project will also use **secondary data**, i.e. existing data produced by European and national statistical bodies (like Eurostat) or collected during previous and on-going EU and national projects. Data will primarily be used by the partner collecting and generating the data and will be used for achieving projects objectives and related scientific and non-scientific dissemination activities. Due to the nature of the project, the data collected will never include information raising ethical issue (e.g. user behavior and health related). Additional cases that may arise will be regulated, during the project lifetime, according to the Grant Agreement and the Consortium Agreement. Data will be formalized in structured **databases** for the purposes of elaborations to be carried out in the project. In addition, the data will be shared with other researchers and the scientific community for leading to new and unanticipated discoveries and provide research material also for those with little or no funding and where possible the project will support for **Open data movement**. According to the Commission strategy to develop and implement open access to research results from projects funded by H2020 work-programme, MED-GOLD will support both the “**Green**” and the “**Gold**” **Open Access (OA)** schemes for the dissemination of the scientific project outcomes. A OpenAire European repository like Zenodo will be considered as hosting space to store a copy of the scientific results of the project during and after the project lifetime. For those research results, which might require a peer review by the scientific community, the “**Gold OA**” will be preferred to the “**Green OA**”. This OA scheme will be granted by submitting the scientific results to an Open Access Journal. Completely free journals will be preferred to pay-per-publish solutions (on high-impact journals) or to non-OA journals that grant an OA after an “embargo” period (delayed OA solutions).

### 2.2.6 IPR Management during MED-GOLD

For the success of the project it is essential that all project partners agree on explicit rules concerning IP ownership, access rights to Background and previous results, and protection of intellectual property rights (IPRs) and confidential information before the project starts.

Therefore, such issues will be addressed in detail within the Consortium Agreement between all project partners.

**Consortium Agreement:** The purpose of the Consortium Agreement is to establish a legal framework for the project in order to provide clear regulations for issues within the consortium related to the work, IP-Ownership, Access Rights to Background and Results and any other matters of the consortium's interest.

**Access Rights to Background and Results:** In order to ensure a smooth execution of the project, in the Consortium Agreement the project partners will grant each other and their affiliated companies, royalty-free Access Rights to their Background and Results for the execution of the project. This will allow the researchers the ability to execute the project to the best of their ability, without being hindered by administrative issues. The Consortium Agreement will define further details concerning the Access Rights for Exploitation to Background and Results.

**IP Ownership:** Results shall be owned by the project partner carrying out the work leading to such Results. If any Results is created jointly by at least two project partners and it is not possible to distinguish between the contribution of each of the project partners, such work will be jointly owned by the contributing project partners. The same shall apply if, in the course of carrying out work on the project, an invention is made having two or more contributing parties contributing to it, and it is not possible to separate the individual contributions. Any joint Results, including inventions and all related patent applications and patents shall be jointly owned by the contributing parties. In order to further the competitiveness of the EU market, and to enhance exploitation of the Consortium Results, each contributing party shall have full own freedom of action to exploit the joint IP as it



wishes, and further the goals of the consortium. To promote this effort, the contributing party will have full own consideration regarding their use of such joint Results and will be able to exploit the joint IP without the need to account in any way to the other joint contributor(s). Further details concerning jointly owned Results, joint inventions and joint patent applications will be addressed in the Consortium Agreement.

**Transfer of Results:** As Results are owned by the project partner carrying out the work leading to such Results, each project partner shall have the right to transfer Results to their affiliated companies without prior notification to the other project partners, while always protecting and assuring the Access Rights of the other project partners. Such use of Results will encourage competitiveness of the EU market by creating broader uses of the Results and opening up the markets for the Consortium's Results in all markets.

**Open Source and Standards:** A central aim of this consortium is to provide benefit to the European community. Some of the project partners may be either using Open Source code in their deliverables or contributing their deliverables to the Open Source communities. Alternatively, some of the partners may be contributing to Standards, be they open standards or other. Details concerning open source code use and standard contributions will be addressed in the Consortium Agreement.

### 3. Implementation

#### 3.1 Work plan — Work packages, deliverables

The overall structure of the work plan, divided by WPs and single tasks, is reported in Figure 1 in the Executive summary. **WP1 has the role of setting the scene** at the early stage of the project: here a comprehensive and multidisciplinary mapping of the three MED-GOLD sectors of interest (olives/olive oil; grape/wine; durum wheat/pasta) at European level, identifying the main initiatives and the main players, will be provided together with a preliminary market analysis taking advantage of the presence in the consortium of three of the most relevant players of these sectors (respectively DCOOP, SOGRAPE, Barilla), the MED-GOLD Champions. To better frame the MED-GOLD pilot services developed in WP2-4 in a wider context, a general assessment of the sectors' vulnerabilities, critical decisions and information needs will be elaborated starting from the contributions of the MED-GOLD Champions and from inputs of the MED-GOLD Community engaged in WP5.

**In the WP 2-4 the MED-GOLD pilot services will be here co-developed and implemented for the three MED-GOLD sectors.** The same methodological framework will be adopted as in the other MED-GOLD quests with three common conceptual layers, identified by each task of the WP: a case specific analysis layer (Tx.1); a development layer (Tx.2); a layer (Tx.3) for the test of the service and finally, an assessment of the added value of the services for the decision-making process (Tx.4). Each WP will be co-headed by a scientific partner with high skill and expertise in the field and by an industrial MED-GOLD Champion. However, beside the common framework, every pilot services have quite peculiar characteristics due to the different nature and needs of the Champions involved and to the different problems to be tackled in each service. This leads to a different timing and PM efforts required in delivering the services and specific question to be addressed, as already highlighted in Section 1.

Central to the success of the project is **the role of the stakeholders**, directly involved as partners (Champions) or engaged in the MED-GOLD community who will provide essential input from a user/decision-makers perspective.

The experience of the pilot services will be further validated and upscaled with the users of the **MED-GOLD community** of the three sectors of interest (olives/olive oil; grape/wine; durum wheat/ pasta), **developed and engaged in WP5** with continuous specific thematic events at national and regional scale.

The **overarching communication activities of WP6** will allow us to reach a wider audience of the agricultural sector at large and even beyond, fully exploiting the MED-GOLD value chain, demonstrating the replicability of the MED-GOLD framework and assuring the potential market uptake of the new climate-informed paradigm here presented.

**Table 3.1b: List of work packages**

<b>WP No</b>	<b>Work Package Title</b>	<b>Lead Participant No</b>	<b>Lead Participant Short Name</b>	<b>PM</b>	<b>Start Month</b>	<b>End month</b>
1	Setting the scene: appraising the MED-GOLD sectors, assessing existing climate information and development of a common ICT platform	11	MetOffice	109.16	1	48
2	Co-design of pilot service on olives/olive oil	12-6	NOA-DCOOP	163.52	1	40
3	Co-design of pilot service on grape/wine	4-13	BSC-SOGRAPPE	102.84	1	40
4	Co-design of pilot service on durum wheat/pasta	10-2	JRC-Barilla	129.04	1	40
5	Engaging, validating and exploiting the pilot services with the MED-GOLD community	15	UNIVLEEDS	109.54	1	48
6	Communication and exploitation of the MED-GOLD value chain	8	GMV	93.25	1	48
7	Management and coordination of MED-GOLD	1	ENEA	56.96	1	48
				<b>764.31</b>		

**Table 3.1c: Description of work packages**

Description of work packages																
Work package number	WP1			Lead beneficiary						MetOffice						
Work package title	Setting the scene: appraising the MEDGOLD sectors, assessing existing climate information and development of a common ICT platform.															
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Short name of participant	ENEA	Barilla	Beetobit	BSC	CNR	DCOOP	EC2CE	GMV	HORTA	JRC	MetOffice	NOA	SOGRAPE	UMNG	UNIVLEEDS	UTH
PM	7	3.84	9.12	7	6	6.8		12		1	18	5	3.4	1	6	23
Start month	1					End month					48					

**Objectives**

- To describe the target market and to analyse its trends and conditions which will affect the profitability of the climate services to be prototyped on top of the results from H2020 relevant existing projects (EU-MACS and MARCO).
- To assess the needs and vulnerabilities of each sector on top of the results from H2020 relevant existing projects ( i.e. EU-MACS and MARCO).
- To identify key climate variables and indicators for each sector

- To assess weather and climate observations focusing on key MED-GOLD locations
- To assess skill and uncertainty in seasonal and decadal forecast information
- To design the technical infrastructure, approach and methodology to data and model management for the project

This work package is led by MetOffice

WP1 provides the foundations for the project in terms of understanding and documenting the current available information pertaining to climate services in the MED-GOLD sectors.

To understand the potential for adding value to climate services in the MED-GOLD sectors, it is first necessary to analyse the following elements for each sector:

1. The present sectoral landscape - namely, the state of relevant research, relevant institutions and actors in the sector, the current market for climate services in the sector, and the regulatory/policy framework governing the sector
2. The present need within the sector for climate information, including the current vulnerabilities to weather/climate and the critical decisions for which weather/climate information is relevant
3. The current state of the art with respect to climate predictions/projections, including their skill over Europe, and the relevant uncertainties

### **Task 1.1: Regulatory and institutional mapping and market analysis (M1-12)**

Participants: **GMV, JRC, UNIVLEEDS, ENEA, Barilla, NOA, CNR**

Each of the MED-GOLD sectors (wine, olives and durum wheat) will be evaluated to estimate the nature of the potential market for climate services in Europe exploiting the available results from EU-MACS and MARCO. For each sector, trends and conditions will be assessed from the perspective of outcome and profitability of the climate services to be prototyped. The role and the weight of EU policies for the three sectors will be analysed (D1.1). Thus, coordination with WP5 and WP6 will be ensured in order to gather as much information as possible about stakeholders (i.e. MACSUR, etc.) to determine their demand along with the main existing initiatives that could be of mutual interest for MED-GOLD (MACSUR, AgMIP, ...) and that could be considered to further disseminate and communicate the main outcomes of MED-GOLD (WP5-6). Market description and analysis will be developed (D1.1) including initial snapshot of the three markets, the potential for growth and for 'market uptake' of the climate services to be prototyped.

**Links with other tasks:** The results of the market analyses will feed into Task 5.1 (Developing the MED-GOLD community) and Task 5.2 (Engaging the MED-GOLD community) and vice-versa. This feedback loop will be also implemented with WP6 tasks.

### **Task 1.2: Assessing sectors' vulnerabilities, critical decisions and information needs (M7-14)**

Participants: **UNIVLEEDS, DCOOP, SOGRAPE, Barilla, JRC, GMV, NOA**

This task aims to identify and determine the main vulnerabilities as the critical activities and decisions pursued within and across the sectors of interest. In this context, vulnerability will be examined in relation to how exposure to climate variability and change affects the sectors' activities and main critical decisions but also in relation to wider macro-conditions such as economic and market conditions and demand for those products. The assessment of the main vulnerabilities, activities and decisions within each sector will be analysed based on a literature review (including both academic publications and grey literature e.g. European project reports).

The outputs from the literature review will provide us an overview of current knowledge of the sectors and a starting point to identify the themes of interest to be further examined in an online survey. The online survey will be developed together with our partners including the experts in the three sectors — DCOOP, SOGRAPE and Barilla — and will expand on the themes identified in the literature review. The survey will allow us to better understand the type of vulnerabilities, activities and decisions within and across the sectors, help to validate the literature review findings as well as expand the knowledge base to support the development of the pilot services in WP2-4. The online survey will also help to ascertain the climate information needs to help support the critical decisions identified (both in the review and survey). These will include determining key climate variables and indicators for each sector (e.g. particular time horizons and geographic areas of interest) (D1.2).

The survey will be developed using a survey software (e.g. Snap Survey) that allows the necessary routing of questions specific to each sector. DCOOP, SOGRAPE and Barilla would participate in the design of the survey and provide key contacts across Europe in order to ensure a good response rate. In addition, the survey will also be

disseminated to the MEDGOLD community (T5.1).

**Links with other tasks:** The needs identified in Task 2.1/3.1/4.1 will be required. Working relationships with users established in Task 5.1 (Developing the MED-GOLD community) will assist with the assessments. The particular needs and vulnerabilities identified will assist with Task 5.2 (Engaging the MED-GOLD community) to further refine and identify the key points of interest in the MED-GOLD community and guide the choices of locations and climate variables for Task 1.3.

### **Task 1.3: Mapping uncertainty and skill in climate data (M1-17)**

Participants: BSC, ENEA, **MetOffice**, NOAA, CNR, JRC

The focus of Task 1.3 is the assessment of climate forecast skill over Europe and how the skill changes as a function of forecast lead time. This assessment will be based on essential climate variables and bioclimatic indicators.

Existing assessments of seasonal and decadal forecast information from EUPORIAS and SPECS will be summarised, and any additional assessments will be made using procedures established in other recent EU projects where applicable. Climate information and evaluation tools from the EU projects PRIMAVERA and CRESCENDO will be included if suitable data are available. Guidance on the variables required will be provided by Tasks 1.2 and particularly from WPs 2, 3, and 4. Additionally, results from the Copernicus CS3 project AgriCLASS would also provide guidance on suitable indicators, both climatic and bioclimatic.

Pan-European datasets of relevant variables will be appraised (D1.3). The evolution of seasonal forecast skill will be assessed for all of Europe, the Mediterranean and other areas key for MED-GOLD. The focus will be on variables relevant for agriculture, including but not limited to temperature, precipitation, humidity, wind and solar radiation. Areas where forecast models have low, medium and high skill will be identified (D1.4). If required, the skill of near-term climate projections (up to 30 years ahead, or whichever time horizon is appropriate) could also be assessed to identify areas where crops could be grown in the future, and current crop areas, which might become less viable. This assessment would include both essential climate variables and bioclimatic indices from WPs 2-4 and provide guidance on which indices would be considered the most reliable, based on historical model performance. Results from this task will feed into WP5 to help frame the outcomes. These assessments will focus on the climate variables and indicators identified in Task 1.2. Climate model runs will be evaluated by using recently proposed advanced statistical approaches characterising the full probability distribution functions.

**Links with other tasks:** Forecast skill for key locations and climate variables will feed into Task 5.1 and Tasks 2.2/3.2/4.2 and 2.3/3.3/4.3 (developing and testing service tools).

### **Task 1.4: Developing a common ICT infrastructure and data management platform (M1-48)**

Participants: **Beetobit**, GMV, EC2CE, UTH

A common ICT platform will be developed, providing a comprehensive horizontal set of common data-management, normalisation and storage tools on which the services for the three sectors (wine, olives and durum wheat) will be implemented. This platform will be used to systematically collect, transform, normalise and manage all the data and models required, including climatic data from Copernicus CDS, and integrate the decision support system, so that vertical pilot services implementations will focus on the specifics of each crop, leveraging the platform itself for basic ICT operation of data acquisition, normalisation and storage. Pilot services will be delivered and other products will be made available so users involved in the pilot studies and the wider MED-GOLD community can test them and provide feedback through the MED-GOLD Forum (see Task 5.2).

The data and modelling process will be managed through a KDD (knowledge discovery in databases) that includes the next steps:

- Data acquisition
- Data preprocessing
- Data mining and modelling
- Data access and sharing policies
- Evaluation, through a leave one out system

The process will be automated as much as possible targeting the efficiency and capacity to manage multiple modelling options. The modelling will be agnostic regarding the algorithms and these will be those fitting better with the problem characteristics. The data will be stored in the cloud and a data governance policy will be implemented guaranteeing the confidentiality of those coming from private sources. The platform will also provide common tools to output information created by the pilot services, in a variety of channels (e.g.: datasets, web dashboards).

**Deliverables**

D1.1: MED-GOLD Core Sectors Description and Analysis (GMV, M12)

D1.2: Assessment of the sectors vulnerabilities, critical decisions and information needs (UNIVLEEDS, M14)

D1.3: Report assessing the quality of European climate observations and their appropriateness for use in climate services for each sector (Met Office, M12)

D1.4: Report assessing the quality of seasonal forecast information and climate projections, and their appropriateness for use in climate services for each sector (MetOffice, M17)

D1.5: Deployment of the MED-GOLD ICT platform (Beetobit, M7)

Work package number	WP2					Lead beneficiary					NOA-DCOOP					
Work package title	Co-design of climate service for olive/olive oil															
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Short name of participant	ENEA	Barilla	Beetobit	BSC	CNR	DCOOP	EC2CE	GMV	HORTA	JRC	MetOffice	NOA	SOGRAPE	UMNG	UNIVLEEDS	UTH
PM	31		19.12	10		28.8	40.6	5			1	22			6	
Start month	1					End month			40							

**Objectives**

Olive growing gives back to the environment more than it takes (i.e., it is a carbon sink, see IOC 2016), and hence the overall objective of this work package is to co-design, co-develop, and co-evaluate a climate service that has high economic and environmental added value to the olive industry by combining tailored information from seasonal climate predictions and long-term climate change projections with artificial intelligence and process-based modelling, so as to improve the economic viability of the olive industry under climate change while maintaining or improving its environmental sustainability.

Specific objectives include:

- To develop a pilot climate service application (i.e., the tool) with focus on olive yield and fruit infestation by the olive fly (*Bactrocera oleae*) that will be driven by climate data as detailed below.
- To assemble a data set of historical and near real time weather data from ground-based observations and satellite data.
- To assemble a climate model data set including seasonal climate forecasts and climate change projections under two different climatic scenarios.
- To evaluate the pilot climate service in terms of added value for decision making.

This work package is led by: NOA and DCOOP

**Task 2.1: Appraising needs and critical decisions (M1-10)**

**Participants: DCOOP, EC2CE, ENEA, BSC, GMV, UNIVLEEDS**

Europe is the major producer of olive oil in the world (73% of production, statistics from EC, July 2012). The major European producers are Spain (66%, Eurostat 2015), Italy (22%), Greece (9%) and Portugal (7%) representing a significant economic activity. Traditional producers coexist with industrial producers. Specifically, DCOOP includes mainly three types of olive farms:

- Conventional olive crop under traditional management.
- Conventional olive crop under industrial management.
- Organic olive groves under traditional management.

The starting point for a climate service focusing on the olives and olive oil production will be an assessment of the key vulnerabilities, information needs and critical decisions for the olive and olive oil producers. This assessment will be achieved through an initial scoping workshop with olives and olive oil producers who will act as representatives of this sector. Following from this initial scoping workshop, the producers involved in the co-design of the climate services will be continuously involved throughout the development process in order to provide ongoing feedback on the work achieved. This ongoing interaction between the producers and the MED-GOLD team will be pursued through regular meetings and updates (either through teleconferences and/or mailing list).

Some of the olive oil sector's needs already identified at seasonal time scales are the improvement of the official yield forecasts, which do not exist in many Mediterranean countries or if they do, they are generally considered not very accurate as is the case for Spain, where yield forecasts are released by public authorities in October. Improvement of yield prediction skill is fundamental to provide clear and strategic added value to the growers. Pests are another important problem for this sector, and co-design at the proposal preparation stage already identified that the olive fruit fly (*Bactrocera oleae*) is currently the major pest problem for DCOOP olive growers, as it is generally the case where olive is grown and the pest species is present. Olive fly can lead to losses of up to 600 Euros per hectare, and the main reason of these losses is that when growers realize that there is an incipient infestation by the olive fly, it is already too late to take action to control the fly (currently growers have this information available 2-4 weeks in advance). A third climate/related critical issue is the management of super-intensive olive orchards in terms of ferti-irrigation on a time scale of up to five months. Simulation models for optimizing both the productivity and costs are already in use and will be further improved by including new weather data sources under the project.

In the long run (20-30 years into the future), climate information is needed for strategic decision making, and for projecting yield trends. Where could olive be grown in the future, and which current olive growing areas would become unsuitable in the future? Planting olive groves in different areas is a very costly procedure, and hence having reliable long-term information about regional shifts in climate suitability for olive would provide considerable added value.

Ongoing climate change is already qualitatively evident to olive growers and the olive oil industry when comparing current weather patterns to those that were typical in the main olive growing areas just about a decade ago, and this already affects current olive production and is expected to keep changing over next few decades. Hence, climate projections may be an important component in designing investment strategies whenever the the amortization period extends to the climate time scale. In addition, the seasonal climate prediction level is expected to be relevant to agronomic management and seasonal marketing strategy.

EC2CE has already developed models for olive fruit fly ("pest model"), as well as olive production at both farm level ("decision farming") and sectoral level ("Supply and Demand"), based on artificial intelligence/machine learning. These models are currently also used in county level modelling of corn yield in the USA, and could be used in a similar way for the olive oil sector, provided that the models are adjusted to the specific conditions of the area to be evaluated (i.e., model calibration). To this end, a variety of data and information need to be collected such as time/space attributes, accessibility, required climate variables, field observations for testing purposes, economic data. This will enable tailoring the models to DCOOP farming conditions in an area of choice, with EC2CE numerical models including both short (seasonal) and long-term (climate change) time scales. The EC2CE models will include a tool to assess model performance against historical records.

The vision of EC2CE can be summarized in a concept called decision farming as related to irrigation, fertilization, pest management (the olive fruit fly, for which EC2CE provides information 4 weeks in advance). EC2CE provides information to olive growers on the basis of weather, agronomic, market conditions and geographic information analysed using artificial intelligence techniques.

In addition to those artificial intelligence models, ENEA will use a mechanistic physiologically based demographic model (PBDM) that explicitly captures the weather-driven biology of the interaction between the olives and olive

fruit fly (Gutierrez et al. 2009). The PBDM predicts the geographical distribution and relative abundance of the two species across time and space independently of the actual species distributions using extant and climate change weather scenarios as drivers for the system. The linked PBDM for olive and olive fly has been used in a geographic information system (GIS) context to estimate the fine-scale ecological and economic impact of climate warming on olive yield and fly infestation across the Mediterranean Basin (Ponti et al. 2014). In collaboration with DCOOP, EC2CE and CREA (third party of ENEA), observational data on the crop system (e.g., olive phenology and yield, phenology/dynamics of the olive fly, levels of fruit infestation by the olive fly) and associated daily weather will be gathered so as to improve the ecophysiological detail of the PBDM model and to make the model more relevant to crop management. The added value of PBDMs generally accrues mostly in terms of regional recommendations for crop management as opposed to precise prediction at field level. This is because PBDM provide an assessment of the olive/olive fly systems at the regional level that is independent of space and time, and hence provides insight on how best allocate limited resources for agroecosystem management.

BSC will participate with EC2CE and DCOOP in the co-design of the seasonal case study with the role of understanding the olive oil sector needs and the processes involved in their decision making. BSC will also help on the identification of specific periods of study and variables. This task will be important to define the methodologies for Task 2.2. GMV will assist on the identification of the right space-based source of information for the identified critical variables (i.e. temperature, precipitation, humidity) for this case.

### **Task 2.2: Developing the tool (M4-M24)**

Participants: NOA, ENEA, EC2CE, BSC, DCOOP, GMV, Beetobit

Development of the climate service tool will address two main methodological issues:

- How to integrate available climate-related data and information (seasonal forecasts and climate change projections as well as satellite-derived earth observation data) in the decision making process;
- How the current approaches to modelling olive yield and olive fruit fly infestation based on machine learning implemented by EC2CE can be complemented by a weather-driven physiologically based demographic modelling approach (PBDM, see <http://www.casasglobal.org/>) for the olive/olive fly system.

Addressing the above methodological issues will result in the following combinations of crop system modelling approach, crop system component, time scale, and spatial scale:

- Crop system modelling: artificial intelligence and process-based PBDM;
- Crop system component: olive yield and olive fly infestation;
- Time scale: seasonal forecasts considering earth observation (EO) time series and climate change scenarios but also near real time observations (status of the crop system);
- Spatial scale: local level (farm with minimum field size of 4 hectares) and regional level (province level for Spain).

The following decision making is potentially affected:

- Market strategy for olive oil as a function of olive yield (as also affected by olive fly infestation);
- Control of olive fly in terms of timing and potentially also strategy/method

Some of the combinations of modelling approach, crop system component, time scale, and spatial scale have already been implemented in Spain by EC2CE for DCOOP, and hence improved added value will be sought using additional cutting edge input data made available by the project. Other combinations will be developed by the MED-GOLD project and hence will generate new added value in new decision making areas.

In close collaboration with ENEA, Beetobit will implement the PBDM model for olive and olive fly (see Gutierrez et al. 2009) in a general way that will enable mechanistic description and simulation of the weather-driven biology of the system. This implementation will enable the PBDM model to be applied to other crop systems with relative ease, so that this approach can be replicated in other climate service applications, both within the project and into the future. Replicability of the general PBDM implementation will be tested in WP6 for the coffee crop system (see Task 6.2). ENEA's third party partner CREA will work on improving the yield component of the PBDM. First, CREA will review how photosynthesis and yield are currently modelled in the PBDM, in order to identify areas for improvement that would make the model more realistic. CREA will also explore potential applications of modeling the effect of temperature during the growing season on oil quality, particularly on fatty acid composition and polyphenols. Contribution by CREA will ultimately increase the realism and skill of the olive PBDM.

BSC will provide seasonal predictions of essential climate variables to feed the aforementioned crop models. Bias-correction methods and statistical downscaling approaches will be explored to provide these specific essential climate variables at the pilot sites.

EO time series for the most critical variable will be produced by GMV based on validated data-sets from

internationally leading organisations (i.e. multi-sensor precipitation data-sets from EUMETSAT). This data will be used to achieve an improved modelling representation of the current state of the olive agroecosystem, with the goal of testing the feasibility of generating near-real time crop decision rules.

NOA and the MetOffice will investigate the impacts of climate change with particular relevance to agriculture and the olive sector. The analysis will be based on daily output from selected regional climate models (RCMs) developed within the CORDEX (<http://www.cordex.org>) initiative. Further processing of the climatic data will be performed, and downscaling techniques will be implemented in order to obtain the appropriate climatic data for southern Europe and for each project pilot area. Some guidance on suitable indicators will be provided by Task 1.3, based on the ability of models to simulate key climatic variables. The climate models used will have a high horizontal resolution of 11km. Climate model data will be available for a continuous period from 1950 up to 2100. From this period, 20- to 30-year periods will be selected, the first period always referring to the current or present climate, whereas the future period will be a 20- to 30-year period from 2021 onwards.

Climatic changes directly or indirectly affecting agriculture will be studied using appropriately constructed climatic indexes that will be included in the modelling process as inputs.

Subsequently, interpolation techniques taking into account the orography will be employed to provide higher resolution results (typically in the order of 3km-5km) for the pilot sites. The primary goal of this effort will be to develop a tool for deriving higher spatial resolution climatic data, based on a three-dimensional interpolation scheme and on available regional climate model output.

### **Task 2.3: Testing the tool (M16-40)**

Participants: NOA, ENEA, EC2CE, BSC, DCOOP, GMV, Beetobit

The value of the decision-making tool will be measured by the differences between producers using or not using such a tool. It is important to highlight that the value will be strongly dependent on the conditions of the specific season and within the project just one will be tested, so it will be valued as a function of performance and extrapolating such performance to other seasons. Hence most of the testing will be retrospective using historical records.

Metrics of performance: for the pest (olive fly), a comparison will be made between a control with no treatment and a test with climate service available. To improve the testing procedure over the 1 year period, there will be multiple locations encompassing a variety of climatic conditions. Unofficial institutional yield estimates that are produced periodically in Spain will be used as a reference standard level of information that is available to users without climate service. DCOOP believes the models must be tested during the first two years and be analysed and executed during the following 2 years, and this will extend beyond the official duration of the project.

GMV will support validation procedures based on the satellite EO indicator time series produced in previous task. Such time series will serve as a high-quality climate record in the validation of the prototyped climate services.

NOA will assess the suitability of predicting climate risk in agriculture from downscaled data (once available). Observational data will be sourced from both the ERA-Interim reanalysis by ECMWF (Dee et al. 2011) and the observational data available from meteorological stations in the regions of interest. In particular, gridded observational data obtained from weather stations will serve as the reference dataset. The nearest model grid point corresponding to each station will be extracted and compared to the reference dataset.

### **Task 2.4: Assessing the added value of the pilot service to the user (M35-40)**

Participants: UNIVLEEDS, GMV, DCOOP

For the olives and olive oil climate services, the assessment of the added value will be jointly pursued with the group of producers involved in this WP. This analysis will help us understand how usable and practical the services developed are to support and inform the producers' decisions. In particular, this analysis will help us understand the services' usability, timeliness and potential added value and benefits for their decision-making (economically and/or non economically). The analysis of the service developed for the seasonal timescale will be performed in real time (i.e. provide the service to the producers and afterwards discuss and validate its usability in supporting the decisions taken during that period). For the climate service focusing on long-term climate change projections, the assessment will be based on the producers' expert judgement with regard to the fit for purpose of the service provided and how that addresses their information requirements regarding future risks in farming activities (e.g. pests), planning activities (e.g. irrigation) and expected productivity.

The assessment of value for both climate services in the olives and olive oil sector will be achieved via a participatory workshop between the producers involved in the development of the climate services and the MED-GOLD partners.



**Deliverables**

D2.1 Report on the knowledge capitalization of the olive oil sector (DCOOP, M10)

D2.2 Report on the tool performance (EC2CE, M24)

D2.3 Report on the tailored indicators and their quality assessment for the specific case studies. (ENEA, M40)

D2.4 Assessment of the added value for the decision-making process. (UNIVLEEDS, M40)

D2.5 A handy easy-to-use manual for stakeholders and practitioners of the climate service tool. PART I: the olives/olive oil sector (NOA, M40)

Work package number	WP3			Lead beneficiary						BSC-SOGRAPE						
Work package title	Co-design of pilot service for grape/wine															
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Short name of participant	ENEA	Barilla	Beetobit	BSC	CNR	DCOOP	EC2CE	GMV	HORTA	JRC	Me Office	NOA	SOGRAPE	UMNG	UNIVLEEDS	UTH
PERSON	9		3.84	22				5			1	7	49		6	
Start month	1			End month				40								

**Objectives**

The overall objective of this work package is to strengthen the efficiency and sustainability of the Mediterranean wine industry in their seasonal- and long-term business strategies using the best information from seasonal climate predictions and long-term climate change projections in a co-production process, with a special focus on the Portugal's Douro Valley, home of Port and Douro wine appellations. This general objective is divided into several specific objectives with strong links between them:

- Development of a pioneer end-to-end wine climate service that respond to specific questions of the wine sector related to their current needs.
- Formulation of the best seasonal probabilistic predictions of extreme climate indices at Mediterranean and site specific spatial scales (Portugal's Douro Valley) based on individual operational forecast systems and multi-system approach.
- Formulation of the best estimate of future climatic and bioclimatic indices with a 30-years horizon based on individual regional and global climate models and multi-model approach.
- Assessment of the service's added value for the decision making with respect the level of information currently available at the wine sector.

This work package is led by: BSC and SOGRAPÉ

**Task 3.1: Appraising needs and critical decisions (M1-9)**

Participants: **SOGRAPÉ**, BSC, ENEA, NOA, GMV, UNIVLEEDS

Seasonal and long-term climate information are crucial for several decision-making processes in the wine sector, such as pest management treatments or processes related to planting a vineyard. In particular, seasonal climate predictions can be useful to determine the number/distribution of expected treatments for the upcoming season for a specific site/region. This is due to very humid Springs usually enhance the pressure from downy mildew (*Plasmopara viticola*) and a number of other pests (*Lobesia botrana* - grapevine moth, for example). In the case of long term climate information, climate projections are essential under a scenario of unstable climate. These

projections can assist with the choice of vineyard perennial characteristics (scion and rootstock varieties, training systems, erosion prevention structures, capacity of irrigation systems, etc.) that impact the economic outcome in terms of providing high-value wines suitable to address market demand over a 30-year span. They can also provide insights as to the long-term risk-management for those structural decisions regarding resilience of the vineyard in face of climate change or emerging pests, while maintaining the sensory characteristics particular of any given region (terroir). This is of particular importance in areas of high-value Protected Denominations of Origin, such as Port.

As the end-user of this pilot service, SOGRAPE will select two case studies, one for each of the two timescales mentioned above, and where climate services can improve their decisions at hand and thus provide higher cost efficiency when compared with the present situation.

The starting point for defining the case studies will be an assessment of the key vulnerabilities, opportunities and critical decisions in the organisation. This will be achieved via interviews with key personnel at SOGRAPE in order to identify and determine the case studies to be developed within the pilot service. The selection of the case studies will be based on the critical decisions that will most benefit from the new information generated by the pilot service in terms of improving the decisions at hand and the potential economic gain.

The UNIVLEEDS will prepare the interview protocol and conduct the interviews in SOGRAPE.

BSC will collaborate in the co-design of the seasonal case study with the role of understanding the wine sector needs and the processes involved in their decision making with the main goal of defining specific methodologies for the medium-term case study necessities to develop the forecast tools in task 3.2.

ENEA and NOA will collaborate in the design of the case-study using long-term climate information, specifying the expected outcomes and the potential barriers. GMV will assist on the identification of the best-suited satellite based source of information for the identified critical variables (i.e. temperature, precipitation, humidity) for the case studies.

### **Task 3.2: Developing the tool (M4-24)**

Participants: **BSC**, ENEA, NOA, SOGRAPE and GMV

This task will focus on two main aspects, one relative to the collection of datasets needed for the two case studies and the other relative to the development of the climate services tools themselves.

First, observational and simulated climate variables, required for each specific case study, will be downloaded, collected and processed to create a database available for the developing of the climate services tools. This database will include observations in situ provided by the user, satellite data, observational gridded data or reanalyses, forecasts and reforecasts from different seasonal forecast systems and long-term projections experiments.

The second aspect, related to climate service tools, will focus on the combination of essential climate variables obtained from seasonal climate predictions and climate change projections into several climatic, bioclimatic and extreme climate indices, already known to affect decision-making process of the wine sector. Starting from those indices proposed by Fontes et al. (2016), a selection of most relevant ones for each case study will be done and tuned for the specific needs of the users defined in Task 3.1.

In the case of the seasonal case study, the extreme climate indices obtained from seasonal predictions will help users to understand what could happen during the next growing season (from March to November) related to easy or severe years in terms of disease control. One factor that limits the application of seasonal climate predictions is the systematic errors or biases, which affect climate prediction systems. Thus, bias-adjustment methods will be explored and applied together with a forecast quality assessment of the predictions, in which simultaneous observed and predicted values are compared. This assessment will be applied for independent seasonal forecast systems against reanalyses and for multi-model, which will be implemented to provide more accurate seasonal climate predictions, uncertainty estimates and reliability.

For the long-term case study, the focus will be on the factors affecting the year-on-year performance of vineyards: terroir suitability as a factor of average temperature of the growth cycle, total annual rainfall and yearly rainfall patterns, etc. Critical characteristics known to be affected by climate parameters (sugar, acidity, colour, ability to age, etc.) should be modelled as a function of projected climate changes and evaluated towards value indicators, such as retail price of wine.

BSC will collect the data needed for the seasonal case study which consist in a set of seasonal forecasts and reforecasts of essential climate variables from both the North American Multi-Model Ensemble (NMME) and the Copernicus Climate Change Service products together with quasi-real observations or reanalyses for comparisons. From those essential climate variables, BSC will obtain predictions of the extreme climate indices defined jointly with SOGRAPE and a bias-adjustment technique, carefully chosen after a preliminary assessment, will be applied to these predictions. A quality assessment of the bias-corrected predictions will be done using several verification

measures. This is a fundamental step in seasonal climate prediction because it assesses whether or not the forecast systems lead to an improved forecast with respect to a standard which is usually the climatology. A combination of extreme climate indices predictions obtained from individual seasonal forecast systems will be done (multi-model approach) together with an assessment of its quality.

ENEA will develop a replicable methodology able to calculate the climatic and bioclimatic indices relevant for the wine sector according to the climate change scenario projections provided by global and regional models from CMIP5 and CORDEX experiments. This methodology will be calibrated and refined considering the historical experiments and results from Task 1.3.

NOA, with the MetOffice, will analyse the impacts of climate change based on daily output from selected individual regional climate models (RCMs) developed within the CORDEX initiative and will also explore the impacts based on a multi-model approach. Subsequently, interpolation techniques (downscaling) taking into account the orography will be employed to provide higher resolution results (typically in the order of 3km-5km) for the target area. The primary goal of this effort will be to develop a tool for deriving higher spatial resolution climatic data, based on a three-dimensional interpolation scheme and on available regional climate model output. Some guidance on indices and downscaling methods would be provided by the Copernicus CS3 project AgriCLASS, which will be tackling similar issues during 2017.

For both seasonal- and long-term cases, SOGRAPE will provide guidance on the choice of most relevant climatic, bioclimatic and extreme climate indices to manage field operations efficiently from the perspective of cost reduction and profit optimization. It shall also indicate wine price bands characteristic of well-defined quality levels that can be related to grape and wine quality indicators. Furthermore, available historical data regarding disease pressure, growth cycle duration and harvest (dates, production and quality) will be provided. 15-minute interval meteorological observations from 9 locations in Portugal's Douro Valley (home to Port and Douro wine appellations), starting in 2011 will be made available for as long as necessary to validate methods, models and calibrations. Finally, SOGRAPE will liaise with relevant third-parties to procure for relevant data otherwise unavailable (national meteorological services, river basin authorities, technical associations, etc.).

EO time series for the most critical variables will be produced by GMV based on validated data-sets from internationally leading organisations (i.e. multi-sensor precipitation data-sets from EUMETSAT).

### **Task 3.3: Testing the tool (M16-40)**

Participants: ENEA, BSC, SOGRAPE, GMV, NOA

Several key periods from the past, particularly critical for the wine sector, will be defined by SOGRAPE for each of the two case studies aforementioned, in which the climate services tool developed in Task 3.2 will be evaluated with the main aim of identifying the added value of the climate services developed within this WP. This added value will be quantified by SOGRAPE in economic terms, making a simulation of what would have been the cost optimization and/or loss reduction of using the tool of the core service for the wine sector. In the case of seasonal case study, the values of the predictions for extreme climate indices, defined in Task 3.2, will be provided for those periods from the past of special interest for the wine sector. A quality assessment of these predictions, against real observations provided by SOGRAPE, will be done using several verification measures to demonstrate the role of climate predictions to anticipate key events. This will imply analysing predictions of the indicators to assess if the cost related to expected treatments for the upcoming season for a site/region could have been minimised. For the long-term case study, a collection of maps and datasets will be produced for the wine-sector specific indicators defined in Task 3.2. When possible, those products will be associated with a validation of the results obtained by using available observations.

BSC will provide an assessment of the tool defined in Task 3.2 against observational data for the specific periods from the past defined by SOGRAPE. This means, to provide seasonal predictions of extreme climate indices defined in Task 3.2 for the specific periods of interest for the wine sector from individual and multi-model seasonal forecast systems. These predictions will be provided together with, at least, two verification measures, one deterministic and one probabilistic. When available, statistical downscaling techniques, understood as a specific bias-adjustment method, will be used for specific locations and fields selected by SOGRAPE. Also, BSC will help SOGRAPE in the interpretation of this seasonal probabilistic predictions.

ENEA will compute the wine-sector climatic and bioclimatic indices for the current and future climate, comparing the former with the available observations in order to evaluate the quality of the produced information. NOA will assess the climatic and bioclimatic indices using gridded observational data from the ERA-Interim dataset produced by ECMWF (Dee et al. 2011), as well as observational data available from meteorological stations in the regions of interest. In particular, the gridded observational data/weather station data will serve as the reference dataset.

GMV will support the consortia with the validation of seasonal predictions and long term projections with the

identified most relevant EO indicator time series which is produced in previous task. Such time series, being an independent source of observations, serves as a high-quality climate record in the validation of the prototyped climate services.

SOGRAPE will assess if the outputs of the services would be relevant to change the decisions they made, in which case it will be possible to evaluate the gains that would be obtained, providing average values from operations and/or resources or production that could be useful for quantifying the economic impact.

#### **Task 3.4: Assessing the added value of the pilot service to the user (M35-40)**

Participants: UNIVLEEDS, GMV, SOGRAPE

The assessment of the wine-related climate services will provide insights on the applicability and usability of the new services to the end-user (SOGRAPE) beyond the technically and scientifically aspects of the climate service (as examined during task 3.3). This will include looking into how usable, practical, time-effective and potentially beneficial for decision-making (economically and/or non economically) the services are under the pressure and constraints (time and otherwise) of a competitive and market-driven business environment.

SOGRAPE will validate the relevance, applicability and practical viability of proposed core services in a real-world situation by engaging with key personnel in relevant departments through in-depth interviews. An assessment of ease-of-use of service outputs by non-scientific, technical staff will be made and output suitability for consequential risk-management and decision-making will be evaluated.

#### **Deliverables**

D3.1 Report on the two case studies at seasonal- and long-term timescales which specifies the wine sector needs, the expected outputs from the climate service, the datasets to be used and the integration of the services' outputs in the decision-making process in a wine company. (SOGRAPE, M9)

D3.2 Report on the methodology followed to implement the wine pilot services at seasonal- and long-term timescales in which will be included the bias adjustment applied and the forecast quality assessment of the predictions for the chosen periods of study(BSC, M24)

D3.3 Report on the climatic, bioclimatic and extreme climate indices developed in the wine pilot services and its quality assessment for the specific key periods/events of interest in the two case studies. (ENEA, M40)

D3.4 Report on the added value of the pilot service to the user. (UNIVLEEDS, M40)

D3.5 A handy easy-to-use manual for stakeholders and practitioners of the climate service tool. PART II: the grape/wine sector. (NOA, M40)

Work package number	WP4			Lead beneficiary						JRC-BARILLA						
Work package title	Co-design of pilot service for durum wheat/pasta															
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Short name of participant	ENEA	Barilla	Beetobit	BSC	CNR	DCOOP	EC2CE	GMV	HORTA	JRC	MetOffice	NOA	SOGRAPE	UMNG	UNIVLEEDS	UTH
PERSON	2.2	3	3.84	10	23			5	35	33	1	7			6	
Start month	1			End month				40								

#### **Objectives**

This work package aims at exploring and identifying new approaches to integrate climate services into agricultural services and assessments focused on durum-wheat. It analyses possible solutions using the current agronomical

knowledge on durum wheat and state-of-the-art climate products, as well as new developments based on scientific advancements in both fields. It explores the current opportunities and future ones that could come from an improved integration. By a joint work of the involved partners, this WP identifies and shows the added-value of user- and market-oriented products from climate services at different levels (from farmers to institutional European bodies) and at different spatio-temporal scales (from seasonal to long-term climate projections and from fields to the Mediterranean region and other key producing regions of the world). The WP offers concrete solutions to the use/design of climate services for durum wheat production by building a pilot based on the experience, the technology and the decisional process of the involved partners. Therefore, the main objectives can be summarized as follows:

- Development of a pilot case study for: seasonal forecast of durum wheat yield, risks of pests and diseases; farmer-oriented decisional process to define and apply better agro-management plans; assessment of potential long term scenarios to contribute designing paths for sustainable developments in the field
- Evaluation and quantification of the potential impact of integrated climate services on durum wheat production systems

#### **Task 4.1: Appraising needs and critical decisions (M1-12)**

Participants: **Barilla, HORTA, JRC, CNR, ENEA, GMV, BSC, UNIVLEEDS**

The starting point for a climate service focusing on durum wheat and pasta will be an assessment of the key vulnerabilities, information needs and critical decisions for the olives and olive oil producers. This assessment will be achieved through an initial scoping workshop with durum wheat producers who will act as representatives of this sector. Producers will be identified among those who are already suppliers of Barilla and who receive agro-meteorological information from HORTA in partnership with Barilla.

Following from this initial scoping workshop, the producers involved in the co-design of the climate services will be continuously involved throughout the development process in order to provide ongoing feedback on the work achieved. The continuous interaction between the producers and the MED-GOLD team will be pursued through regular meetings and updates (either through teleconferences and/or mailing list).

Existing agronomic and climatic modeling systems will also be analyzed to identify the opportunities for adapting existing tools to specific user needs. Specific needs of Barilla as well as market needs (provided by WP1) will be taken into account in the developing phase of the pilot (Task 4.2). CNR, supported by Barilla, will perform analysis of 'Delphi' modeling system (durum wheat forecasting system). HORTA, supported by Barilla, will conduct an evaluation of its decision supporting system 'granoduro.net'. JRC will analyze its wheat modeling framework for climate change and climate extremes impact assessment to investigate knowledge/process gaps and novel approaches that could benefit from dedicated climate services products in terms of seasonal forecast, decadal predictions and climate projections. Barilla, HORTA, CNR, JRC, ENEA, GMV and BSC will closely interact to define a set of specific and opportunities to be addressed by task 4.2. In particular, market needs (as given by WP1) will be fully taken into account to ensure highest possible replicability of the outcomes of WP4.

#### **Task 4.2: Developing the tool (M4-24)**

Participants: **JRC, CNR, HORTA, BSC, ENEA, GMV, NOA, MetOffice**

This task will be mainly based on four different approaches:

- model-based (building on both CNR-Barilla and JRC systems);
- decision-support system (Horta, 'granoduro.net');
- index-based systems;
- hybrid systems

The integrated model-based approach will be based on improving the existing infrastructure of CNR-Barilla 'Delphi' modelling system and JRC system. Reproducibility and usability by the community will be crucial and will drive the improvement as well as the partial re-design and implementation of the systems (when needed). Seasonal time-scale forecasting will be mainly provided by the Delphi modeling system, while the longer time scales will be mainly tackled with the JRC modeling system. As for the former, the focus will be mainly on yield forecast, risk of diseases and quality assessment. While for the latter one, sustainable development and adaptation to climate change will be also investigated. The spatial focus will be the Euro-Mediterranean region from the local to the regional scale, but within a global context to assess the resilience of the European durum wheat production system per-se and in the global market.

The decision support system 'granoduro.net' will be used to test how the information from climate services can be transferred across the different levels of the agronomic and agro-climatic community (at durum wheat farmers

level) and then how the feedbacks (moving back to the institutional level) can be used to improve the entire multi-level decisional system profitably.

The index-based system will be complementary to the modeling approach and it will be applied at the different spatio-temporal scales (from seasonal to decadal and from local to regional). This approach will enable to better understand and characterize the intrinsic uncertainties and the sensitivities associated with critical processes not completely understood, e.g., the effects of climate extremes and the interaction between them and the crop phenology.

Finally, the hybrid systems will be deployed to combine different approaches (e.g. modeling and decision support, modeling and index-based). Thus, to show how this approach can help in getting a comprehensive characterization across the different spatio-temporal scales and overcome drawbacks and deficiencies of the single methods.

All the activities of this WP will be based on seasonal forecast, decadal predictions and climate projections. The relevant climate variables (needed by the aforementioned systems) will be bias-corrected by designing novel methods and procedures (JRC and BSC) as crop modeling requires a large number of dependent climate variables. The added value of the bias-correction for critical values, such as precipitation, will be tested in simulated *ad-hoc* exercises (JRC). These tasks will be performed in close collaboration with WPs 1,2 and 3. BSC will collect seasonal forecasts and reforecasts of essential climate variables from both the North American Multi-Model Ensemble (NMME) and the Copernicus Climate Change Service. BSC will also provide a quality assessment of predictions against reanalysis by using several verification measures. Satellite retrievals (EO) time series for the most critical variable will be produced by GMV on the basis of validated data-sets from internationally leading organizations (i.e. multi-sensor precipitation data-sets from EUMETSAT). JRC, ENEA and NOA will retrieve and analyse climate projections from both global (CMIP5) and regional climate model runs (EURO-CORDEX, Med-CORDEX). They will investigate the impacts of climate change on the specific sector and suitable state-of-the-art downscaling procedures will be implemented and applied. All the developed procedures and methods will be implemented in an open-source environment by guaranteeing replicability, scalability and high flexibility.

#### **Task 4.3: Testing the tool (M16-40)**

Participants: CNR, JRC, HORTA, GMV, BSC, ENEA, NOA

The approaches developed in the Task 4.2 will be evaluated by CNR, JRC and the other partners. The added value of seasonal forecast will be assessed by looking at the historical yield data and by comparing the pilot with traditional crop forecasting systems. HORTA will test added value of seasonal forecast on ‘granoduro.net’ by comparing the outputs of the decision-support system with real field data, assessing both experimental and commercial fields. Concerning the longer time scales, the evaluation will be performed by building pseudo-realities and by testing specific user-driven scenarios. The pilot will be also evaluated by involving farmers associated with ‘granoduro.net’ and by organizing events (in WP5 and WP6) to obtain feedbacks and suggestions from the agro-climatic community.

GMV will support the validation of the seasonal predictions and long term projections with the identified most relevant EO-based indicators time series (Task 4.2). Such time series, being an independent source of observations, will serve as a high-quality climate record in the validation of the prototyped climate services.

#### **Task 4.4: Assessing the added value of the pilot service to the user (M35-40)**

Participants: UNIVLEEDS, GMV, HORTA, Barilla, JRC

In this task, the assessment of the added value will be performed with the group of farmers directly involved in the development of the climate services for durum wheat. This assessment will provide us insights into how usable and practical the service is to support and inform the farmers’ decisions in terms of their usability, timeliness and potential added value and benefits for their decision-making (economically and/or non-economically). If possible, the analysis of the added value of the service developed for the seasonal timescale will be realized in real time (i.e. providing the service to the producers and afterwards discuss and validate the usability of the service provided). For the climate service focusing on long-term climate change projections, the assessment of the added value will be based on the producers’ expert judgment with regard to the fit for purpose of the service provided and how that addresses their information requirements regarding future risks in farming activities (e.g. pests), planning activities (e.g. irrigation) and expected productivity.

#### **Deliverables**

D4.1 Report on the identified specific needs and opportunities (HORTA-Barilla, M12)

D4.2 Design of innovative agro-climatic systems for durum wheat. (JRC, M24)  
 D4.3 Evaluation of the pilot (CNR, M40)  
 D4.4 Assessment of the added value for the decision-making process. (UNIVLEEDS, M40)  
 D4.5 A handy easy-to-use manual for stakeholders and practitioners of the climate service tool. PART III: the durum wheat/pasta sector. (NOA, M40)

Work package number	WP5			Lead beneficiary						UNIVLEEDS						
Work package title	Engaging, validating and exploiting the pilot services with the MED-GOLD community															
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Short name of participant	ENEA	Barilla	Beetobit	BSC	CNR	DCOOP	EC2CE	GMV	HORTA	JRC	MetOffice	NOA	SOGRAPE	UMNG	UNIVLEEDS	UTH
PERSON	4	2.88	0.96	11	4	4.8	1.9	10	2	4	1	6	8		41	8
Start month	1			End month				48								

### Objectives

This WP will engage with the MED-GOLD community at local, national and European level. This community will be formed of other public and private organisations in Europe working in the MED-GOLD sectors of analysis but not directly involved in the pilot services developed in WP2, 3 and 4. The aim of this community is to help us refine and improve the findings from the pilot services as well as validate and upscale those outputs beyond the services developed in the project. To achieve this, the WP will focus on developing and establishing the MED-GOLD community across the three sectors by engaging with existing networks that can act as entry points to their communities of users. The MED-GOLD community will then act as a test-bed for the services developed in WP2, 3 and 4 in order to allow us to further check and validate the suitability of the services and explore the potential for transfer and upscale the products in other organisational and institutional settings.

### Task 5.1: Developing the MED-GOLD community (M1-6)

Participants: UNIVLEEDS, BSC, GMV, ENEA, CNR, NOA, JRC, SOGRAPE, EC2CE, DCOOP, Barilla, HORTA, UTH

This task aims to establish the MED-GOLD community, which will be composed by other organisations in Europe working in the three MED-GOLD sectors. This will include public and private organisations from the policy and decision-makers operating in the sectors of interest to the potential end-users of the pilot services being developed in MED-GOLD. This community is expected to act as a 'bed test' to discuss, explore and validate the developments and findings from the pilot services in WP2-4. The involvement in this community will allow them to be continuously informed on the latest advances of the research as well as contributing to the validation and upscaling activities that will be pursued in Task 5.2.

This community will be created through a range of different actions. The starting point will be the organisations whose information has been collected during Task 1.1. and which will be approached and informed of the MED-GOLD project and be given the option to join our mailing list (and the online user forum at a later stage). In addition, direct contact with key European organisations (e.g. networks, associations, private companies including SMEs) working in the sectors will also be pursued. These organisations will act as multiplier organisations in the sense that they act as a point of entry to other users operating in those sectors. These will include, amongst other :



Olive oil	Wine	Durum wheat
<ul style="list-style-type: none"> <li>- Cooperativas Agroalimentarias de España</li> <li>- International Olive Council</li> <li>- Spanish Olive Oil Interprofessional Agency for olive oil from Spain</li> <li>- Association Française Interprofessionnelle de l'Olive</li> <li>- Associazione Italiana dell'Industria Olearia</li> <li>- Stazione Sperimentale per le Industrie degli Oli e dei Grassi</li> <li>- Special Institute of Fats and Fat Derivatives</li> <li>- Spanish Council for Scientific Research</li> <li>- Citoliva (Olive and Oil Technological Center)</li> <li>- California Olive Oil Council</li> <li>- The North American Olive oil Association</li> </ul>	<ul style="list-style-type: none"> <li>- Federación española del vino</li> <li>- International Organization of Vine and Wine</li> <li>- Comité des Entreprises Européennes de Vins</li> <li>- Vinum &amp; Spiritus Belgium</li> <li>- Union des Maisons &amp; Marques de Vin</li> <li>- Verband Deutscher Sektkellereien e.V.</li> <li>- Cyprus Wineries Association</li> <li>- Verband Deutscher Weinexporteure e.V.</li> <li>- Greek Wine Federation</li> <li>- Federation of Hungarian Vine and Wine Producers</li> <li>- Confederazione Italiana della Vite e del Vino</li> <li>- Malta Wines Association</li> <li>- Koninklijke Vereniging van Nederlandse Wijnhandelaren</li> <li>- Associação de Vinhos e Espirituosas de Portugal</li> <li>- Patronatul National al Viei si Vinului</li> <li>- Wine Association Slovenija</li> <li>- Association Suisse du commerce des Vins</li> <li>- Wine and Spirit Trade Association</li> </ul>	<ul style="list-style-type: none"> <li>- Associazione Industriali Mugnai d'Italia</li> <li>- Union of Organisations of Manufacturers of Pasta Products of the EU</li> <li>- International Pasta Organization</li> <li>- Union des Associations des <i>Semouliers</i> des Pays de l'Ue</li> <li>- Associazione delle Industrie del Dolce e della Pasta italiane</li> <li>- European Flour Millers</li> <li>- Committee of Professional Agricultural Organisations</li> <li>- General Committee for Agricultural Cooperation in the European Union</li> </ul>

Other MED-GOLD partners also have key contacts in these sectors across Europe (e.g. UTH, ENEA, JRC, NOA), which will also be invited to be part of the MED-GOLD community. It is also expected a certain degree of a 'snowball effect' (where these organisations put us in contact with other organisations) to occur which will also allow the community to grow over the lifetime of the project. A mailing list of the MED-GOLD community will be compiled during this task and will be used for future dissemination and engagement e.g. registering in the online user forum (Task 5.2), online survey (Task 5.2) and periodic bulletins and webinars in (Task 5.3).

The work started in this task with regard to the community development is expected to continue in the other tasks in WP5 namely through access to the MED-GOLD User Forum and participate in the online survey (Task 5.2) as well as the option to receive periodic bulletins on the pilot service development and attend thematic webinars (Task 5.3).

**Links with other tasks:** Input from Task 1.1 regarding users that can have an interest in joining the MED-GOLD community. Input from Task 1.3 on the state-of-art of climate predictions of sectoral interest. Input from Task 6.1 in the form of bulletins and visualisation products. Output to Task 1.2 in terms of contacts collated for dissemination of the survey in T1.2.

### Task 5.2: Engaging, validating and exploiting the pilot services with the MED-GOLD community (M6-48)

**Participants:** UNIVLEEDS, BSC, ENEA, NOA, CNR, GMV, JRC, SOGRAPE, EC2CE, DCOOP, Barilla, HORTA, UTH

This task aims to actively engage with the MED-GOLD community in order to continuously share, discuss and evaluate the pilot services developed for the three sectors as well as provide feedback to those services. The ongoing engagement with the MED-GOLD community will also allow us to continuously validating services as well as exploring their potential applicability in the wider community. This task will be achieved through a series of engagement activities, including:

- **MED-GOLD forum** (M6-48) This online platform will allow the MED-GOLD community to raise questions and discuss the pilot services with the MED-GOLD team. This forum will also help to dynamise discussion on specific topics of interest. The configuration and maintenance of the online forum will be performed by BeetoBit.
- **Participatory workshops** (M36-48) These workshops will be delivered after testing the pilot services developed in WP2, 3 and 4 with the users involved in those WPs. Their aim is to allow a space for presenting, discussing and assessing the potential for upscaling and applying the pilot services in other organisations operating within the three sectors in MED-GOLD.



For example, in the olives and olive oil sector we will aim to discuss and validate the findings from the WP2 pilot service in the Canino traditional olive district. This region is part of an area of integrated pest management of olive fly, which is an ongoing collaboration between ENEA (MED-GOLD partner) and the Food and Agriculture Organisation. As such, we will engage with farmers in the region to explore the potential usability of the pilot service developed in WP2 in that region.

We will organise at least 3 workshops (1 per each sector). The workshops will be organised after the testing of the pilot services in WP2, 3 and 4 (i.e. from month 36 onwards). These workshops will allow us to present the pilot services developed to a wider group of users in the MED-GOLD sectors as well as explore the potential to upscale and apply those services in those users' contexts. In doing so, this will help us to understand the potential for replicating and/or adapting the services developed across other user groups as well as the drivers and barriers that can hinder the uptake of the services developed by others. The organisation of the participatory workshops will be led by UNIVLEEDS together with partners.

- **Online survey (M36-48)** An online survey will be developed and disseminated to the MED-GOLD community as well as to other organisations of interest (e.g. through snowball effect). The aim of this survey is to a) engage with the MED-GOLD community regarding the climate services developed in each sector and b) ascertain the potential usability of those pilot services in those organisations. This survey will complement the participatory workshops, which will only be able to engage with a limited number of participants in Europe. The survey will be developed using a survey software (e.g. Snap Survey) and disseminated via a number of mechanisms including the MED-GOLD User Forum, the MED-GOLD Advisory and Stakeholders Boards, key European initiatives and projects (e.g. FAO, MACSUR, JPI-FACCE) as well as other available platforms (e.g. Twitter, LinkedIn). The UNIVLEEDS will lead the development of the survey together with the partners.

**Links with other tasks:** Inputs from Task 1.1 and Task 1.2 are expected to help us refine and identify the key points of interest in the MED-GOLD community. Inputs expected from Task 2.4/3.4/4.4. on the added value of pilot services to the users involved in the development of the pilot applications. Outputs to Task 2.4/3.4/4.4. regarding feedback from the MED-GOLD community on the tools developed. Outputs to inform Tasks 5.3 and 6.2. regarding the development and, at a later stage, the upscaling of the pilot services with the MED-GOLD community.

### **Task 5.3: Dissemination activities to the MED-GOLD community (M6-48)**

Participants: **BSC**, UNIVLEEDS, ENEA, Met Office, GMV, Beetobit, EC2CE, CNR, JRC

The main outcomes of the project and pilot services will be periodically reported to MED-GOLD community. This dissemination will help highlight the main findings regarding the development of the pilot services as well emphasise the added value of the research. This task will be led by communication experts at BSC with collaboration of partners and will include:

- **Periodic Bulletins** - Periodic bulletins (2 to 3 pages) will be issued twice a year describing the last developments in the pilot services for the three sectors and their added value; best way to communicate and visualise the prototypal services; and the application of the pilot services to decision-making.
- **Thematic webinars** - Thematic webinars will also be organised focusing on a particular topic of interest within the MED-GOLD sectors. These webinars will be organised based on the specific interests of the MED-GOLD community and/or the need for discussing a specific topic in those sectors or pilot services being developed. We expect at least one or two of these webinars per year.

These dissemination activities (bulletins and webinars) will be circulated and available to those within the MED-GOLD community who expressed an interest in being informed of the development of the project and disseminated through the mailing list developed in Task 5.1.

**Links with other tasks:** Inputs from Tasks 2.2, 3.2 and 4.2 on the development of the tool for the MED-GOLD sectors to prepare the periodic bulletins.

### **Deliverables**

D5.1 Report on the potential to upscale the pilot services to other user groups (UNIVLEEDS, M48)

D5.2 Report on the online survey findings (UNIVLEEDS, M48)

Work package number	WP6			Lead beneficiary						GMV						
Work package title	Communication and exploitation of the MED-GOLD value chain															
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Short name of participant	ENEA	Barilla	Beetobit	BSC	CNR	DCOOP	EC2CE	GMV	HORTA	JRC	MetOffice	NOA	SOGRAPE	UMNG	UNIVLEEDS	UTH
PERSON	5	2.45	4.8	12	3	6.2	4.8	17	1	2	2	11	6	4	6	6
Start month	1					End month					48					

### Objectives

- To implement a comprehensive communication and commercialization plan for the new generation of climate services.
- To leverage on MED-GOLD community of users to foster international cooperation based on MED-GOLD pilot climate services.
- To contribute towards the development of a climate service market in Europe.
- To provide science-based knowledge relevant for climate relevant Policies (Common Agriculture Policy, regional policies, biodiversity and water policies) and global agreements (UN SDGs, Paris COP21 and Marrakech COP22).

This WP is led by GMV

#### Task 6.1: Interactions with other initiatives (M6-M48)

Participants: **MetOffice**, ENEA, CNR, BSC, GMV, UNIVLEEDS, NOA, JRC, UMNG

This task will pursue dissemination synergies with other EU initiatives such as Climate-KIC, JPI Climate, FACE-JPI, JPI Water and related ERA-NET (e.g. ERA-NET on Climate Services) as well as clustering with other climate service related EC funded projects via H2020 or other complementary programmes (i.e. LIFE, Copernicus, PRIMA, etc.). Such interactions will allow to foster effective international cooperation as well; for instance coordination with existing H2020 projects on the topic (i.e. EU-MACS, MARCO) will ensure that any potential overlapping is avoided.

The MetOffice coordinates ClimateEurope, which involves pursuing synergies with other EU initiatives. This activity would be expanded under MED-GOLD to include participation in events organised by other initiatives relevant to MED-GOLD. This WP will take care of keeping fruitful contacts and interactions with other initiatives in the agro-climatic community such as AgMIP and to other broader ones such as MedECC.

Finally, coordination with WMO and UN initiatives will be ensured from their high level and global perspective.

As a result, D6.1 will be produced by MetOffice and updated annually.

#### Task 6.2: Replicability on new potential markets and market uptake (M25-M48)

Participants: **GMV**, ENEA, Beetobit, BSC, EC2CE, UMNG

This task is focused on the study of deployment and market uptake of the developed climate services to either other geographical or other crop market different from project pilots by demonstrating their added value and adaptation possibilities.

The following issues will be tackled leveraging on the project communication activities: understanding the target communities, fostering a smart approach in their operations and defining incentives and pricing schemes. Replicability on such wider audience will consider the need of different approaches according to each sector structure and private-public dynamics on each region/country.

Particular attention will be paid to Colombian coffee as another crop within agriculture sector, which will serve to

tailor/adapt the developed tools. The coffee system has been already developed using the PBDM approach and provide some basic info about the crop in Colombia, such as main climate-related problems including key pests. This info would serve as a starting point for developing a climate service for coffee. The model can be extended to different coffee species/cultivars and to explore its possibilities in a given set of climate conditions. Other bio-economy related markets such as forestry, livestock and fisheries will be explored as well on the basis of the project case studies, good practices and lessons learned during the pilots. From a geographical perspective, the different global regions will be analysed under the urgency of the SDG 13. Special attention will be paid for market creation in South America and Africa under international cooperation frameworks (i.e. development banks).

Their specific barriers related to policy, regulatory, social, cultural, economic, quality standards or technological issues will be studied. The potential market uptake of the co-designed added value chain will be assessed together with sector stakeholders. Thus, the business feasibility for the new generation of climate services not only in agriculture but in the bio-economy sector at large will be confirmed. As a result, a Climate Services Replicability (D6.9) will be reported by GMV.

### **Task 6.3: Dissemination and capacity building towards policy-makers and general public (M1-M48)**

Participants: **BSC**, ENEA, CNR, GMV, MetOffice, NOA, JRC, UMNG

This task supports the implementation of the EU current mitigation and adaptation policies to climate change through a better-informed decision making and through its adoption in key vulnerable sectors, as those under the umbrella of bio-economy.

Also, it contributes in the implementation of the Sustainable Development Goals (SDGs), in particular SDG 13 'Take urgent action to combat climate change and its impacts'. This involves **awareness actions** on a more general public, including other sectors outside from the MED-GOLD community, relevant stakeholders and decision-makers, and **science-based policy briefing or executive summary** aimed to provide relevant information that serves as input in the development of protocols, community instruments, policies, legal and administrative measures. It will include recommendations on active incentives such as fiscal measurements or insurances promotion as well as recommendations for refining goal targets monitoring in an objectively manner for the different geographical scales (i.e. local, regional, national, European, and global). The policy briefing will be circulated outside from the MED-GOLD community (see Task 6.1 with the interactions with other initiatives). Contacts from the agricultural sector regarding other crops (i.e. Colombian coffee), but also in the forestry, livestock and fisheries sectors will be particularly targeted.

Moreover, the task contributes to the conclusions of the COP21 Paris Agreement. In particular, deriving **dissemination and capacity building material** in support of the implementation of COP22 Marrakech decisions.

The external website of the project will be launched in the early stages of the project for an effective communication outside the consortium and for timely dissemination of foreground information. This will include podcasts, videos, and other means to reach a large audience of non-specialists and to build the bridge science-society-climate. It will be hosted and maintained by ENEA, as project coordinator (D6.8)

D6.4 will be specifically prepared by CNR. Moreover, D6.2 will be specifically prepared by UTH.

**Links with other tasks:** Outputs from Task 1.2 about assessing sector vulnerabilities, critical decisions and information needs for awareness and elaboration of the science-based policy briefing/executive summary. Task 6.2 about the replicability on new potential markets will be used as input for this task, regarding specific barriers related to policy, regulatory, social, cultural, economic and technological issues.

### **Task 6.4: Showcasing stakeholders' experiences (M25-M48)**

Participants: **ENEA**, CNR, BSC, GMV, Met Office, UNIVLEEDS, SOGRAPE, Barilla, HORTA, DCOOP, UMNG

This capacity building task contributes towards promoting a better informed and connected broad spectrum of end-users community beyond the three sectors of MED-GOLD. This will be achieved through the dissemination and sharing of the project's end-users' success stories as early adopters of the pilot services developed. This showcasing will be pursued through a single stakeholders' workshop at the end of the project for cross-fertilization among the different sectors to be invited. This is different to WP5's workshops. Special attention will be paid to explain in a practical manner how to understand and use the uncertainty associated to climate services results.

In particular, DCOOP will share the results achieved from the project on the olive oil sector, SOGRAPE will explain the success results from the wine sector and Barilla-HORTA will report on their experience associated to the durum wheat sector. The workshop will also allow participants to share and exchange ideas regarding the potential to apply and use the pilot services developed in their organisational decision-making context.

This workshop is expected to be conducted either in ENEA, FAO or DG-AGRI/DG-RTD premises due to their

centrality in Europe and in order to engage with a wider audience and increase the impact of this workshop. This will represent a major project event and will absorb a lot of resources and preparation time.

#### **Task 6.5: Summer Training Events (M25-M48)**

Participants: **ENEA**, CNR, MetOffice, UNIVLEEDS

Organize two summer events for professional and early career climate scientists in the area of climate science and stakeholder application for the agricultural sector and beyond. These summer schools will be open to participants within and outside MED-GOLD, in order to train in the multidisciplinary arena of climate services science. This will develop and train new research expertise in the interface between climate variability and stakeholder application. Each summer school will cover specific applications issues related to the MED-GOLD sectors and beyond.

As a general result of the overarching communication activities, all the WP6 partners will contribute to generate dissemination and capacity building materials (D6.3). Any publication from any partner derived from this task will contribute to D6.5 and D6.7.

#### **Task 6.6: Business Plan (M1-M48)**

Participants: **GMV**, ENEA, BSC, MetOffice, UNIVLEEDS, NOA, SOGRAPE, Barilla, HORTA, DCOOP,

This task will develop a Business Plan, where the release of MED-GOLD solutions to the European (and later, global) market will be analysed in order to obtain the maximum profitability. The Business Plan will be prepared as a preliminary version at M18, then updated according to project evolution and a final version will be part of the post validation (Pilot case studies) assessment and delivered at Month 48. It will include studies on the users that will be targeted towards those more promising market segments. In this context, different marketing and product sales options will be considered for each one. The successful commercialization and marketing of MED-GOLD results will be enabled by the demonstrated benefits and performance regarding End-Users needs. The partners of this consortium will estimate the added value for their business in WP2, WP3 and WP4 which will be inputs for this plan. MED-GOLD sustainable business strategy and operations will be also fed by WP1 inputs on market analysis, leverage benchmarking and business competitive intelligence analyses and determine viable business models (including marketing mix packages) for the MED-GOLD results. This task also accommodates the continuous analysis of the MED-GOLD potential impact and opportunity in the market for both climate service supply and demand sides, without neglecting the continuous monitoring and observation of climate services' technologies and approaches landscape. As a result, a document on the business plan will be delivered (D6.10). This document will present the results of a competitive market analysis of already existing climate services and components relevant to MED-GOLD. This deliverable will constitute the basis for subsequent exploitation of MED-GOLD exploitable results, including the actual technical innovation/knowledge transfer and concrete business models to be adopted with regards to the project's results.

#### **Deliverables**

D6.1: Climate Related Initiatives Interactions Report (MetOffice, M12, M24, M36, M42)

D6.2: Co-designed Climate Services Communication and Exploitation Indicators Report (UTH, M24, M42)

D6.3: Dissemination and Capacity Building Materials (BSC, M24, M36, M42)

D6.4: Science-based knowledge relevant for climate-related Policies (CNR, M24, M36, M42)

D6.5: Compilation of Publications Abstracts (UNIVLEEDS, M24, M36, M42)

D6.6: Summer Training Event Report (ENEA, M30, M42)

D6.7: Summary of Dissemination and Communication Activities (GMV, M12, M24, M36, M48)

D6.8: Website (ENEA, M3)

D6.9: Climate Service Replicability Report (GMV, M48)

D6.10: Business Plan, Technology Transfer – IPR report (GMV, M48)

Work package number	WP7			Lead beneficiary					ENEA							
Work package title	Management and coordination of MED-GOLD															
Participant number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Short name of participant	ENEA	Barilla	Beetobit	BSC	CNR	DCOOP	EC2CE	GMV	HORTA	JRC	MetOffice	NOA	SOGRAPE	UMNG	UNIVLEEDS	UTH
PERSON	30	1	0.96	1	4	1		8		1	1	1	1		1	6
Start month	1		End month					48								

### Objectives

The objectives of this WP are to ensure execution of MED-GOLD in conformity with the EC Grand Agreement and the Consortium Agreement, to negotiate any necessary changes to these agreements during the project, and to manage risk and perform contingency planning so that the project reaches its goals. Interface with the European Commission and accomplishment of MED-GOLD's administration will also be ensured.

More specific objectives of the WP are to (1) Provide high-level management of MED-GOLD to ensure its aims are efficiently and effectively met, on time and with the resources budgeted; (2) Provide effective reporting and communication between the consortium and the European Commission; (3) Oversee the management of the stakeholders within MED-GOLD; ensure the appropriate level of consultation with the advisory board of independent experts; and promote the project to a wider audience; (4) Coordinate effective communication within MED-GOLD, between partners and stakeholders; and by co-ordinating, preparing and disseminating material detailing MED-GOLD purpose and results; (5) Ensure that all the data used within the project are available in a predefined formatted and in a common location; (6) Organise all MED-GOLD meetings; (7) Organise quality control procedures and develop a quality assurance manual (QA manual).

This WP is led by ENEA

#### Task 7.1: Project coordination and administration (M1-48)

Participants: ENEA, Beetobit, UTH

This task manages the intra-project collaboration, maintenance of Consortium Agreement and other coordination tasks, as described in Section 3.2. This task also includes (i) organization of general project and Project Coordination Board (PCB) meetings; (ii) information in the consortium about the status of the other international projects or initiatives. The consortium will seek for the following gender aspects: (i) overseeing promotion and handling of gender equality in the project; (ii) inclusion of mechanisms to remove gender bias from recruiting processes and assure the confidentiality that prevent evaluators from knowing personal characteristics. In addition, this task deals with the intra-project financial administration and collaboration with the European Commission on budgetary issues including forwarding of financial audits prepared by independent auditors of consortium members. This task also includes the set up and implementation of a software system to support project coordination and. This system, based on Phabricator, a web-based collaboration solution, will provide all necessary tools for communications and project coordination, including task and milestones managing, project knowledge base, digital assets management and code versioning facilities for the general ICT infrastructure and horizontal applications.

#### Task 7.2: Liaising with European Commission (M1-48)

Participants: ENEA

This task will ensure the appropriate follow-up of MED-GOLD obligations from the EC contract (scientific, reporting (of science results and finances), project reviews, communication, and management). The Project Officer appointed from the EC will be invited to the appropriate MED-GOLD meetings. If there are any major problems

within MED-GOLD that cannot be solved through the appropriate management structure, the Coordination will liaise with the EC in order to seek advice and a solution

### **Task 7.3: Innovation and Scientific Coordination (M1-48)**

**Participants:** ENEA, WP Leaders

The main components of this task are the close observation of progress made in the scientific and technological fields in the context of all WPs, the coordination and monitoring of the WP leader activities, the overview of all technical outcomes (reports, software, experimental data etc.) produced within the project and the quality control of project deliverables.

### **Task 7.4: Communication Management Plan (M1-48)**

**Participants:** ENEA, CNR, BSC, GMV, MetOffice, UNIVLEEDS, UTH

This task aims to prepare a strategic and comprehensive communication plan to tackle the different project stakeholders and perspectives, including both public and private organizations in the agriculture sector even beyond the chosen project crops and including policy makers as well as citizens. Other sectors related to the bio-economy market (i.e. forestry, livestock, fisheries) will be approached also. It will maximize the relevance and applicability of scientific marketing through open dissemination of research findings and results to academic and scientific world.

### **Task 7.5: Quality control, documentation repository and knowledge management (M1-48)**

**Participants:** UTH, ENEA

Provisioning and maintenance of a repository for all reports, deliverables and project relevant documents on an internal Wiki. We aim to develop a quality plan that details the quality methods, standards and procedures adapted to MED-GOLD environment. Furthermore, a detailed plan for risk management will be created. We will define deliverable quality and integration requirements, and rules for proper knowledge usage. A strategy to control the quality of the ongoing activities will be proposed by providing activity templates to be periodically filled by each task and WP leader. Documents and deliverables will be hierarchically organized in a knowledge base. Task leader will be responsible for checking the availability of required documentations and project deliverables, and will invite partners to use and to feed the knowledge base according to the timetable of work plan activities. Criteria to evaluate the quality of intermediate and final results of each task will be defined based on recommended best-practice quality insurance techniques. Based on those, checklists will be defined and periodically processed by the task leaders.

### **Task 7.6: Data Management Plan (M1-48)**

**Participants:** ENEA, Beetobit, CNR

A Data Management Plan will be prepared for facilitating the access and re-use of the research data generated along the project. All data information will be electronically documented into a web application on the project website. A comprehensive and well defined set of metadata will help users to find and to retrieve the different information. Training and advice on data sources, data formats and metadata will be provided for users within the project.

### **Task 7.7: Operation & Coordination of the Advisory Committee Members (M1-48)**

**Participants:** ENEA, WP Leaders

This Task will operate the External Advisory Committee Members (ACM) in order to offer MED-GOLD achievements for a broader discussion and consultation. The ACM will be appointed by M3 at the latest after consulting with the EC also. Thus, the outputs of MED-GOLD will be developing over time with broadest contribution from the specific professional community starting from the expertise of consortium members and involving representatives of relevant organisations and expanding with representatives of key European and international organisations initiatives in the field. ACM will bring additional value-add by helping to support effective policy dialogue with major stakeholders and primary beneficiaries from a spectrum of domains on urban design and smart cities research policy in Europe, essential for the implementation of MED-GOLD. ACM will thus facilitate MED-GOLD in pinpointing pertinent expertise and actors to ensure that MED-GOLD encompasses the broadest possible community of research and policy makers who may gain tangible benefits from engagement. The ACM Board may act as a collaboration channel with other policy makers and initiatives addressing commonalities of intent with MED-GOLD and as a consultation body for it.

**Deliverables**

D7.1.x: Periodic Project Activity Report (ENEA, M24(a) M48(b))

Periodic administrative report including description of progress of work towards the objectives of the project, and explanation of the use of the resources and financial statements.

D7.2: Final Project Report (ENEA, M48)

A report related to the evaluation of the results of all activities carried out during the project. This report is intended to explain how beneficial the project has been for the community as well as describe all technical achievements of the project during its 48-months lifetime.

D7.3: Communication management Plan (GMV- UTH, M4)

D7.4: Data Management Plan (CNR-ENEA, M3)

**Table 3.1c: List of Deliverables**

Del. number	Deliverable name	WP	Short name of lead participant	Type	Dissemination level	Delivery date
D1.1	MED-GOLD Core Sectors Description and Analysis	WP1	GMV	R	PU	M12
D1.2	Assessment of the vulnerability of each sector	WP1	UNIVLEEDS	R	PU	M14
D1.3	Report assessing the quality of European climate observations and their appropriateness for use in climate services for each sector	WP1	MetOffice	R	PU	M12
D1.4	Report assessing the quality of seasonal forecast information and climate projections, and their appropriateness for use in climate services for each sector	WP1	MetOffice	R	PU	M17
D1.5	Deployment of the MED-GOLD ICT platform	WP1	Beetobit	DEM	PU	M7
D2.1	Report on the knowledge capitalization of the olive oil sector.	WP2	DCOOP	R	PU	M10
D2.2	Report on the tool performance	WP2	EC2CE	R	PU	M24
D2.3	Report on the tailored indicators and their quality assessment for the specific case studies	WP2	ENEA	R	PU	M40
D2.4	Assessment of the added value for the decision-making process	WP2	UNIVLEEDS	R	PU	M40
D2.5	A handy easy-to-use manual for stakeholders and practitioners of the climate service tool. PART I: the olives/olive oil sector	WP2	NOA	R	PU	M40
D3.1	Report on the two case studies at seasonal- and long-term timescales for the wine sector	WP3	SOGRAPE	R	CO	M9
D3.2	Report on the methodology followed to implement the wine pilot services	WP3	BSC	R	PU	M24
D3.3	Report on the climatic, bioclimatic and extreme climate indices developed in the wine pilot services	WP3	ENEA	R	PU	M24
D3.4	Report on the added value of the pilot service to the user	WP3	UNIVLEEDS	R	PU	M40
D3.5	A handy easy-to-use manual for	WP3	NOA	R	PU	M40

	stakeholders and practitioners of the climate service tool. PART II: the grape/wine sector					
D4.1	Report on the identified specific needs and opportunities	WP4	HORTA-Barilla	R	PU	M12
D4.2	Design of innovative agro-climatic systems for durum wheat	WP4	JRC	R	PU	M24
D4.3	Evaluation of the pilot	WP4	CNR	R	PU	M40
D4.4	Assessment of the added value for the decision-making process	WP4	UNIVLEEDS	R	PU	M40
D4.5	A handy easy-to-use manual for stakeholders and practitioners of the climate service tool. PART III: the durum wheat/pasta sector	WP4	NOA	R	PU	M40
D5.1	Report on the potential to upscale the pilot services to other user groups	WP5	UNIVLEEDS	R	PU	M48
D5.2	Report on the online survey findings	WP5	UNIVLEEDS	R	PU	M48
D6.1	Climate Related Initiatives Interactions Report	WP6	MetOffice	R	PU	M12, M24, M36, M42
D6.2	Co-designed Climate Services Communication and Exploitation Indicators Report	WP6	UTH	R	PU	M24,M42
D6.3	Dissemination and Capacity Building Materials	WP6	BSC	R	PU	M24, M36, M42
D6.4	Science-based knowledge relevant for Climate related Policies	WP6	CNR	R	PU	M24, M36, M42
D6.5	Compilation of Publications Abstracts	WP6	UNIVLEEDS	R	PU	M24, M36, M42
D6.6	Summer training events	WP6	ENEA	OTHER	PU	M30, M42
D6.7	Summary of Dissemination and Communication Activities	WP6	GMV	R	PU	M12, M24, M36, M48
D6.8	Launch of external website	WP6	ENEA	DEC	PU	M3
D6.9	Climate Replicability Report	WP6	GMV	R	PU	M48
D6.10	Business Plan, Technology Transfer – IPR report	WP6	GMV	R	CO	M48
D7.1	First Project Activity Report	WP7	ENEA	R	PU	M24,M48
D7.2	Final Report	WP7	ENEA	R	PU	M48
D7.3	Communication management Plan	WP7	GMV	R	PU	M4
D7.4	Data management Plan	WP7	CNR	R	PU	M3



## 3.2 Management structure, milestones and procedures

### 3.2.1 Organizational structure and decision-making

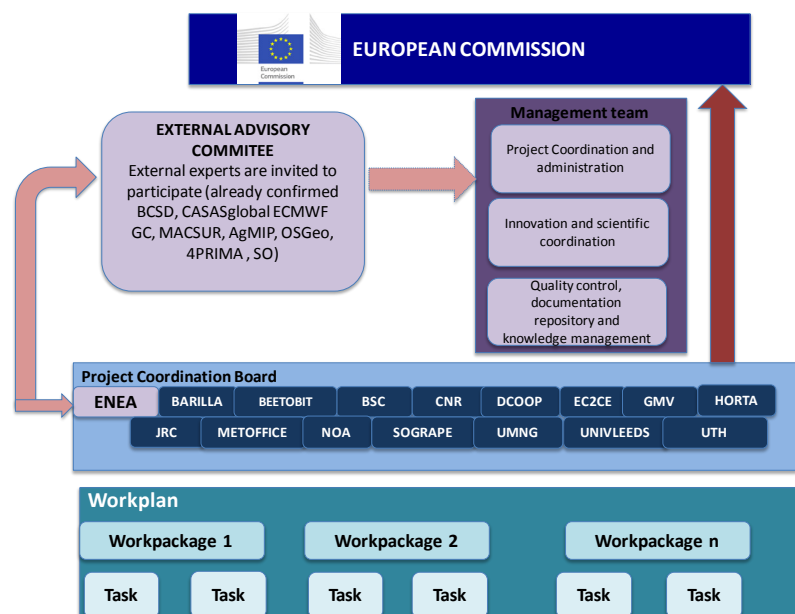


Figure 3.2.1a: MED-GOLD organizational structure

The consortium recognizes that an effective management and organizational structure is critical for the success of MED-GOLD that requires a high level of coordination for the strong interdependency of the several WPs. In this section, we discuss how MED-GOLD will ensure that project resources will be invested towards prescribed objectives, outline an appropriate management structure, and detail operation of controls and internal and external communication mechanisms. It should be mentioned that the management structure and procedures have been already used with success in several successful projects. Our objective is to establish flexible and effective mechanisms, which ensure that the whole array of specialized skills and interests in the consortium are fairly represented following a flexible approach that supports dynamic reconfiguration,

considering the absolute novelty of the MED-GOLD initiative, also in terms of co-development of services with the users, and of a unprecedented systemic interaction and engagement of stakeholders at regional level in the perspective a real downstream service that could reach the key actors in the European agricultural sector. The structure (Fig. 3.2.1a) is described below:

- **Project Coordination Board (PCB).** The PCB is the highest-level management body of MED-GOLD and consists of the Project Coordinator (ENEA) and representatives of all MED-GOLD contractors, each having one vote. It is led by the Coordinator, who has the decisive vote in case of equal votes. PCB will physically meet once every four to six months to review and plan project work. Any Partner may raise issues at the PCB meetings. The PCB is in charge of supervising MED-GOLD progress and deciding upon all major technical and administrative issues, such as redirection of work in a WP, major transfer of resources across WPs or Partners, implementation choices, changes in time plans, inclusion of a new Partner, substitution or exclusion of an existing Partner, and resolution of conflict between different WPs.
- **Project Coordinator (PC).** The PC represents the project and the consortium as a whole, manages project resources, monitors overall project performance, reports to the EC, and promotes project visibility. He is also the chair of the PCB and the Executive Board (EB) and is the primary contact point for all formal communication between the project and the Commission as well as any other external stakeholders. Additionally, the role of the PC is to audit the R&D performance of the project and ensure successful implementation of technical and business objectives. PC is responsible to resolve any issue arising from the detailed project work programme and to ensure that effective solutions to any implementation problems or technical limitations are devised. This part is undertaken by ENEA with its MED-GOLD coordination team.
- **Administrative Coordinator (AC).** The AC will be responsible for the administrative and financial issues of the project and will support the project partners to prepare financial and administrative reports. AC will not only produce and monitor the Annual Financial Statements, but will also receive the Partners' person effort and expenditure on a Quarterly basis. AC will provide feedback to the Partners and PC. This part is undertaken by ENEA.
- **Work Package Leaders.** WP Leader refers both to a contractor and its executive and implies the responsibility to ensure the streamlined execution of a particular Work Package as well as the management of the associated working group. Each WP Leader is part of the EB and is also responsible for resolving WP internal problems, reviewing WP deliverables and reporting to the PC.
- **External Advisory Committee (EAC).** The EAC within MED-GOLD will be chartered with helping to steer its key goals and indicating how MED-GOLD can leverage networks and outcomes of pertinent initiatives and enhance the exchange of knowledge with the society at large around Europe. The EAC will comprise a number

of high-profile experts from international organisation and form key actors of the agricultural sector, selected on the basis of their expertise and objectivity with the aim of ensuring effective knowledge exchange through engagement with the Working Groups; (1) Industrial representatives; (2) Balanced representative from geographical regions; (3) Researcher and scientists who will be able to follow the results of MED-GOLD and to enhance its impact selected on the basis of their expertise and objectivity with the aim of ensuring effective knowledge exchange through engagement with the Working Groups. Meetings of the Advisory Committee would take place once a year immediately following the appropriate MED-GOLD meetings and events so that EAC members could attend the meetings and then meet to comment on the activities as well as suggest future directions. The EAC will be finalized at the beginning of the project. However, several European and international organisations have already manifested their interest in participating (see Table 3.2.1a)

**Table 3.2.1a: MED-GOLD Advisory Board already confirmed**

Advisory Board			
Short Name	Institution	Country	Advisor
BCSD	Business Council for Sustainable Development	Portugal	Sofia Santos
CASAS Global	Center for the Analysis of Sustainable agricultural systems Global	US	Andrew Paul Gutierrez
ECMWF	European Centre for Medium-Range Weather Forecast, Copernicus Climate Change Service	EU	Carlo Buontempo
GC	Ghisen Consulting	Australia	Mark Ghisen
MACSUR	FACCE MACSUR Knowledge Hub	Germany	Martin Banse
AgMIP	AgMIP, Michigan State University	US	Bruno Basso
OSGeo	Open Source Geospatial Foundation	US	Venkatesh Raghavan
4PRIMA	Partnership for Research and Innovation in the Mediterranean Area	Italy	Angelo Riccoboni
SO	Southern Oregon University	US	Gregory V. Jones

### 3.2.2 Quality Assurance

The Project Coordinator is responsible for implementing the Quality Management Process (QMP) within MED-GOLD. In consultation with all contractors the PCB details the Quality System employed so as to best address the needs of the project. Clarifying and documenting the QMP is one of the first tasks of the PCB at the start of the project, followed by publication and dissemination to partners of the Project Quality Plan.

It is essential that quality requirements are qualified with measurable and specific objectives. For example, the functionality, performance, reliability, extensibility and maintainability of MED-GOLD must be specified in measurable terms. The next stage is for every WP Leader with the overview of the PC to define specific quality plans and subsequently monitor progress against them following the quality control mechanisms.

Finally, it is the responsibility of the PC within WP Boundaries Management task to identify and clarify possible WP interdependencies to ensure that critical deliverables, on which others depend, have been reviewed quality-wise and are accepted before they are used by other parts in the project. This is an iterative continuous process, which is necessitated by the repetitive and progressive definition of MED-GOLD and inherent dependences across Work Packages. As the project progresses, it is necessary that the quality system evolve and be tailored to the emerging situation.

### 3.2.3 Project Planning and Control

In Section 1 of MED-GOLD, we provide detailed information regarding the project work-plan and deliverables. We now outline our approach in refining this plan to meet evolving requirements of the project. Indeed, upfront effective activity planning within a project establishes a basis for promoting clarity, avoiding conflicts and allowing for corrective actions and appropriate decision-making. Effective planning provides the criteria to measure progress towards project goals and serves as a guide to distribute fairly and efficiently responsibilities among involved parties in accordance to their committed resources and competencies. The project plan will be analysed and subdivided in individual components of more restricted scope at project launch. Each component will detail the specific steps within the proposed methodology, the responsibilities and required resources and skills to accomplish each of the related work package objectives and contribute towards fulfilling the project milestones.

To ensure that the work described in MED-GOLD is carried out in accordance to project and WP provisions and within the accepted tolerance requirements, MED-GOLD will follow an appropriate process to monitor and control

progress. This involves activities that run through MED-GOLD duration from project initiation to its closing. MED-GOLD will define specific reporting mechanisms to provide management committees with the information required to monitor and control project resources, cooperation among experts and working groups, performance of the overall work and capability of specific techniques employed to deliver targeted outcomes within the time schedule.

### 3.2.4 Risk and change management

A final essential component of project management in MED-GOLD is risk management. Since MED-GOLD is a quite innovative project, there is a considerable amount of risk to be managed. In this case, risk is seen as the possibility of exposure to unfavourable circumstances affecting the successful completion of MED-GOLD. To alleviate the possible negative effects of unforeseen circumstances MED-GOLD provides process and technical alternatives for the evaluation and control of potential project risks, with particular focus on diagnosis and pre-emptive action. In the proposed methodology, the risk management process involves two activities:

- **Risk Analysis** involves identification of specific risks and assessment, evaluation of their potential importance and estimation of the level of probable failure for the project. In case a risk level may result to tolerance levels above those acceptable, risk analysis defines required actions to address the risk and reduce its potential effects to within acceptable levels.
- **Risk Management** involves planning of required activities to manage the effects of risk, through redistribution of resources, the evaluation of the results and making sure that the new action plan is stable and compatible with the project objectives.

From a risk management perspective, of particular importance for successful implementation of MED-GOLD is the Operational Risk that is, the potential compromise of project deliverables in terms of timing and schedule of delivery, estimated and available resources and meeting quality requirements. The objective is to avoid unjustified project breaks, budget excess and uncontrollable time or scheduling extensions.

### 3.2.5 Decision-Making Process and Conflict Resolution

In the course of MED-GOLD, partners will have to evolve, negotiate and agree on the technical, scientific and exploitation strategy and detailed task implementation. Agreement will be sought first through informal contact, followed by official confirmation via electronic mail, letter or agreed written minutes. For issues that are critical, any agreement may take the form of a short report or memorandum that is signed by representatives on PCB. Non-technical factors such as resource allocation and contractual terms will also need to be agreed and documented in writing. In case of potential conflict, the PC will be immediately informed to co-ordinate their actions to best address the situation. Conflicts related to technical issues within the specified contractual commitments that do not involve a change in the description of work document or a change of budget (or resource allocation) as for example changing the focus of a planning component, will be discussed by the EB and the PC. Decisions will normally be sought by reaching consensus. However, if after a reasonable amount of time there has been no resolution and partners are defending incompatible and conflicting positions, to avoid deadlock and associated operational risk, the approval of a two-third majority of the partner quorum will be sufficient to validate a decision. If the decision taken is unacceptable by partners holding minority positions, then the problem will be elevated to the higher executive officer. If it is not possible to resolve the problem in this way, the PC is obliged to call an extra-ordinary PCB meeting. In this case, to resolve deadlock resulting from a tie in voting, the PC can use his discretionary vote to make a decision or elect to call a new meeting of the PCB within 4 weeks to allow for additional negotiations. Major conflicts that involve contractual changes will be discussed and resolved at PCB level directly. At the PCB, a decision is taken by majority vote between contractors and PC. In case of a tie (equality of votes) the vote of the PC will decide the winning outcome. If no resolution is acceptable, then the Red-Flag procedure will be used as the last resort, thus forcing the consortium to re-evaluate its position regarding their contractual obligations. Furthermore, the coordinator will inform the EC in writing and will discuss the issues arising with the responsible Project Officer before a final decision is made. The PCB has the discretion to modify budget and workload allocation within the agreed limits during the project. The PCB also has the power to force a principal contractor to exit the consortium. In this case, any resulting changes to the budget and to contractual issues (hard and soft contract amendments) will be reported to European Commission and will be implemented following its approval. A conflict resolution procedure can be initiated by any member of the PCB or the PC unilaterally.

### 3.2.6 Information flow

The following provisions will ensure efficient information flow within the project:

- Tools for the timely exchange of internal technical and business documentation.
- Notification of relevant new publications in the literature.

- Dissemination of reports on external-facing meetings.

All technical documentation generated by the project shall be available in standard electronic format, following a set of guidelines to be agreed upon at project start. Exchange of information will be facilitated primarily via e-mail and file transfer over the Internet through the management platform developed in WP7 at the very early stage of the project. A core ingredient for effective project communication is the operation of mailing lists, specifically lists related to the discussion of technical and business development issues. Topic-specific lists will also be operated, namely lists addressing the needs of particular WPs.

Ordinary mail will be used for strictly formal correspondence, i.e. when executive signatures are required. Adherence to agreed communications standards will be enforced by the Project Coordinator. Three-monthly control reports will be submitted by each partner to the Project Coordinator. They should list contributions, publications and meeting attendance details which can help in understanding provided effort and cost figures. These reports will form the basis for editing of the six monthly periodic progress reports to be forwarded to the Commission reporting the project progress.

### 3.2.7 Project Management Tools

Different management tools will provide the consortium the communications infrastructure to coordinate required work for the successful completion of the project. Accounts will be set-up for all members of the consortium. The selected tool will be also the private document repository of Monthly updates will be carried out according to requirements of the contract and various tables and graphics will be used to demonstrate project progress.

The typical graphics include GANTT chart (see Fig. 3.2b), Network diagram and histograms depicting resources employed and/or costs. The reports and graphics to be used will depict deviations from planned project targets including delays or early finishes and implications on the overall progress will be evaluated. Then the corrective actions that are necessary for implementation will be taken as appropriate.

Results and recommendations will be communicated to the Technical Manager and to the work package leaders so that corrective actions can be taken in a timely manner in order to achieve optimum performance. Quarterly reports will be issued, where detailed reporting and the progress achieved during project execution will be demonstrated using the above-mentioned software.

MED-GOLD milestones are set up as indicated in the Table 3.2.7a.

**Table 3.2.7a: List of Milestones**

Milestone number	Milestone name	Related WPs	Estimated date	Means of verification
MS1	Internal project website and management platform ready	WP7	M3	On line
MS2	MED-GOLD Community developed	WP1; WP5	M6	Report
MS3	Report on the MED-GOLD mailing list	WP1; WP5	M7	Report
MS4	Set up the MED-GOLD User Forum	WP1; WP5	M8	Successfully online
MS5	Initial scoping workshops concluded	WP2; WP4	M12	Report
MS6	Beta version of the tool ready	WP2-3-4	M16	Successfully online
MS7	Overall quality of climate data for agricultural sectors assessed	WP1; WP2; WP3; WP4	M17	Report
MS8	Preliminary version of the business plan ready	WP6	M18	Report
MS9	Data management check and update	WP7	M24	Report
M10	A handy easy-to-use manual for stakeholders and practitioners of the climate service tool	WP2; WP3; WP4	M40	Report

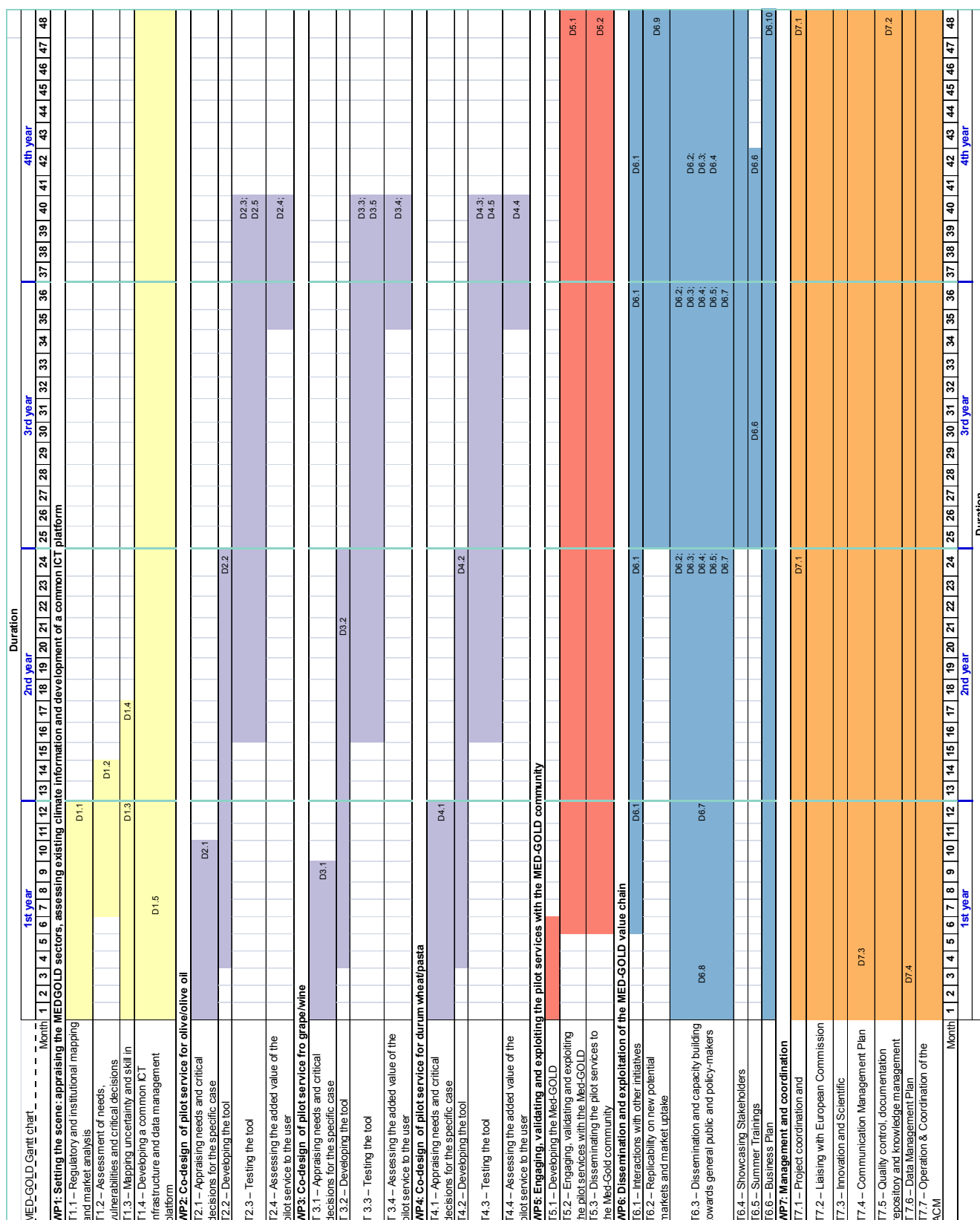


Figure 3.2b: MED-GOLD GANTT CHART

### 3.2.8 Critical Risks

MED-GOLD presents some generic risks inherent to large research-oriented international projects. In the sequel, we present these risks:

#### Management risks

Management is a possible source of risks. However, as explained in Section 3.2.1, the structure of management tasks and organization of the project have been carefully considered. The experience of the project coordinator, existing links of trust and cooperation between all partners, and the activation of special management procedures at the onset of problems will reduce risks coming from Management. The major issue is to ensure that project milestones are met, and to take corrective actions if necessary in a timely fashion.

The coordination, supported by the project office, will be responsible for the monitoring of the risk factors explained above. If deviations from the project plan are identified, the coordinator will seek to achieve solutions together with the involved unit: work packages, tasks or partners. He will make use of the management structure in appropriate manner, contacting the EB, the Governing board, the advisory board, the financial administration or the European Commission. In case a conflict between participants emerges concerning the exploitation of knowledge from the project, the coordinator activates the litigation panel, which will work together with the involved parties to a proposal for solving the conflict. The evolution of the project in terms of milestones and deliverables will be monitored closely through intensive communication with all WP leaders so that appropriate actions can be proposed if necessary.

#### Scientific risks

MED-GOLD has the strong (but realistic) ambition to create a new climate-informed paradigm in the agri-food chain starting from three of the most relevant crops for the Mediterranean ecosystem: this unprecedented activity is intimately susceptible to inherent risks associated with undertaking research and by breaking new ground in bridging the current gap between climate service providers and users.

One possible risk is associated to difficulties in effectively engaging end-users for the WP5 validation and upscaling activities. The difficulties in the **involvement of end-users** have been clearly identified in the past activities as one of the main barriers for a full growth of a European market of climate services. This risk is mitigated in MED-GOLD as, since the writing phase of the proposal, a relevant **number of letters of interest** from different users have been received (see annexes in Sec. 5). In these letters end-users have explicitly showed an interest in the MED-GOLD activities constituting a not negligible first core of MED-GOLD community. This assures that we don't start from scratch in developing the Community and, at the same time, makes more familiar, since the beginning of the project, the MED-GOLD themes for a wide range of users. As a matter of fact, the expressions of interest so far received came from a wide range of users (**international organisations, SMEs, professional associations**) that ensure a balanced blend of end-users in the first core of the MED-GOLD community. Moreover, some partners (such as for instance ENEA and UTH) have already had previous experiences with users in central Italy and in Thessaly that could be used as a first core of local upscaling of the pilot services. Finally, the already well established professional networks of the industrial MED-GOLD partners (DCOOP, SOGRAPE, Barilla) will allow the consortium to reach a wide audience of end-users through a well-known (for the end-users) and **authoritative entry points**.

Another scientific risk is that users express that their major interest is in a variable/derived quantity for which it will turn out there is no skill/large uncertainty in the climate predictions/projections. **The expectation management** is one of the key issues in the development of fruitful climate services. This risk is mitigated by the use of a wide spread of climate data in MED-GOLD (satellite data, reanalysis, hindcast, climate prediction/projections) and by an assessment of quality of climate data in the early stages of the project: in case of **lack of skills of climate predictions** in one of the services co-developed in MED-GOLD this will be immediately clarified and conveniently communicated to the users. In case, two options will be taken into account, depending on the final decision of users: a) the services will be developed only considering observational and historical data; b) the information will be however provided at the time scales originally requested even if the climate forecast are not skilful, as recently happened in similar initiatives such as the EUPORIAS project. In that context, the users showed an interest in receiving climate information even if not skilful.

Again, we have identified another possible risk in a **possible inability to identify user needs** clearly, as often occurred in past initiatives on climate services. However, this risk is mitigated by **early engagement of users** during the preparation of the proposal when a first working hypothesis has been identified for the three sectors. The **presence of the three industrial problem-holders** assures an unprecedented expertise in understating the needs of the sectors of interest, together with the participation of MED-GOLD partners in other initiatives with this specific focus (e.g. C3S QA4Seas). Finally, **the interaction** foreseen in WP1 and WP6 with **other H2020 projects** (EU-MACS, MARCO) on these issues can further allow us to further mitigate this risk.

Another source of risk for the correct progress of the project is some **delay with the Copernicus Climate Data Store** that is here considered as the main hub to access to climate data (Observations, Reanalysis, Predictions/projections). This risk is actually mitigated by the high capacity of the research institutions involved



(MetOffice, BSC, ENEA, NOA) that have **consolidated capacity in accessing all kind of climate data**, forecasts and scenarios directly for the existing gateways (ESGF, CORDEX, ECMWF, .....

Finally, a possible risk is a **limited value proposition** for the pilot climate service here developed. Although it is not possible to mitigate this risk with direct actions, alternative valuable outcomes to the replicability of the tools are the awareness on climate services and the replicability of the cross-sectoral methodological framework.

A contingency plan has been devised for each case and is shown in below Table 3.2.8a.

**Table 3.2.8a: MED-GOLD Contingency plan**

Risk Description	Impact	Related WPs	Contingency plan
Delays in the partners' responses and release of the agreed results and documents.	L	ALL	More effective means for contacting the partners will be used (skype calls, direct phone calls). Persistence of the delays with possible negative effect on the quality and time of delivering the results will be communicated to the EC.
A partner leaving the consortium or being unable to perform a task within the given time schedule or the budget allocated to it.	L	WP7	The appropriate management procedures to remove the partner in question will be done by the PC. Next steps will be either to reallocate the work to a partner who has the capacity, skills and profile to undertake the work, or call for expressions of interest from new partners to fill the gap created.
Budget constraints may pose obstacles to the development procedures.	L	WP7	The full vision of the project may require much more resources than those available to the project. In the initial phase, several aspects of the framework will be identified and researched. After this, these aspects will be prioritised and only the most important aspects will be implemented in order to provide the fundamental functionality.
A partner actually fails to deliver the expected results	L	WP7	The Project Coordinator can, following indication provided by WP leader, reallocate manpower within the consortium or sub contract another entity with proper competence, using funding initially assigned to partner who failed to deliver results.
Any internal or external issue (see above) forces changes in the work plan	M	ALL	Risks management will be dealt as outlined above. A direct communication between Project Coordinator and the WP Leaders will allow detecting and correcting in the most appropriate way possible deviations from the planning.
Difficulties in the involvement of end-users	M	WP5; WP6	A relevant number of letters of interest from different users have been received (see annexes in Sec. 5). In these letters end-users have explicitly showed an interest in the MED-GOLD activities constituting a not negligible first core of MED-GOLD community.
Low skill/large uncertainty in the climate predictions/projections of interest for MED-GOLD activities	M	WP2; WP3; WP4; WP5	Use of a wide spread of climate data in MED-GOLD (Satellite data, reanalysis, hindcast, climate prediction/projections) and by an assessment of quality of climate data in the early stages of the project
Possible inability to identify user needs clearly	M	WP2; WP3; WP4; WP5	The presence of the three industrial problem-holders assures a unprecedented expertise in understating the needs of the sectors of interest
Delay with the Copernicus Climate Data Store	L	WP1; WP2; WP3	High capacity of the research institutions involved that have consolidated capacity in accessing all kind of climate data
Limited value proposition for the pilot climate service here developed	L	All WPs	Alternative valuable outcomes to the replicability of the tools are the awareness on climate services and the replicability (WP6) of the cross-sectoral methodological framework

### 3.3 Consortium as a whole

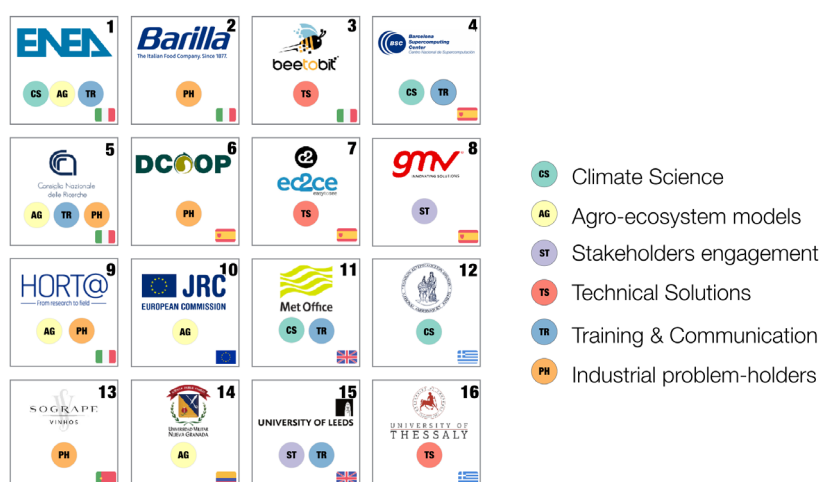


Figure 3.3.a: MED-GOLD Consortium with nationality and main contributions for each partner

The consortium (Fig.3.3.a) is truly multi-disciplinary, with climate impact and adaptation measures experts, economists, global and regional climate experts and modelers, climate-risk scientists, private SMEs and industrial partners (**Barilla**, **SOGRAPÉ**, **DCOOP**) as well. The scientific partners have all been active in a number of EU-projects in the climate services, in the agricultural sectors, climate change research and in the climate impact and assessment fields, and have at the same time extensive experience in the interactions with public and private stakeholders for the European region. The scientific partners have extensive experience in academic research and in response mechanisms and

actions to user-needs (**ENEA**, **BSC**, **CNR**, **JRC**, **MetOffice**, **NOA**, **UMNG**, **UNIVLEEDS**, **UTH**). They encompass the required expertise for undertaking a project addressing the issues of developing a new climate-informed paradigm of decisional process in the agri-food chain for the three crops/products of particular relevance in the Mediterranean region (olives/olive oil; grape/wine; durum wheat/pasta) and for the agricultural sector at large. The commitment of the project toward a sustainable development of the climate service in Europe is demonstrated by the involvement of SMEs and private companies (**Beetobit**, **EC2CE**, **HORTA**, **GMV**)

#### 3.3.1 Complementary expertises in the WP leaderships

The roles of WP leadership and co-leadership, together with the overall coordination on the activities have been chosen in the perspective of optimization of skills and competences.

- In WP1, the leadership of **MetOffice** assures the large overview of the complex landscape of climate services for the agricultural sector. In fact, **MetOffice** can take advantage of the participation to almost all the most relevant past research experiences on climate services: **ECLISE**, **EUPORIAS** (as coordinator), **SPECS**. Furthermore, their strong role in the ongoing **C3S-SIS** tender on agricultural sector (namely, **AgriCLASS**) allows the MED-GOLD consortium in establishing easily links with these activities and related networks associated.
- The WP2 (on olives/olive oil pilot service), similarly to what happens in the others workpackages on the pilot services, will be co-led, in the perspective of co-design and co-development, by a scientific partner (**NOA**) and the industrial MED-GOLD Champion of the corresponding sector of interest (**DCOOP**). **NOA** has a strong expertise in the Climate Services activities starting from the first seminal EU projects (**CIRCE**, **CLIM-RUN**...). Moreover, **NOA** assures a great expertise and authoritativeness in the agricultural sector as coordinator of a LIFE project (**ADAPT2CLIMA**) on the impacts of climate change for the agricultural sector (in particular on olive trees and grapes) in great Mediterranean islands. On the industrial side, as already mentioned, **DCOOP** brings the expertise of one of the largest cooperative of Spanish farmers, with olive oil production as core business.
- In WP3 (on grape/wine pilot service) the strong experience and expertise of **BSC** in climate services and climate predictions (**SPECS**, **EUPORIAS**, **PRIMAVERA**) together with the several initiatives in the agricultural sectors (such as the initiative with **JRC** on seasonal forecast predictions to be used within the **MARS** Crop Yield Forecasting System) fits and complement the huge expertise of the industrial co-leader **SOGRAPÉ** in the wine sector, at Iberian and European level. Moreover, **SOGRAPÉ** exhibits an unprecedented level of expertise even in the climate services and climate prediction activities, as proved by their participation, holding different functions, to recent research initiatives (**EUPORIAS**, **MICROWINE**, **BIODIVINE**)



- WP4 will be co-lead by **JRC**, already involved at European level in the forecast of durum wheat yield by using MARS system and present in several EU research initiatives on climate services (CIRCE, CLIM-RUN, ACQWA) and by **Barilla**, the most relevant international brand of pasta, who co-design the service in the key role of problem-holder. In the technical co-development of this activity **Barilla** will be also technically supported by the **HORTA** that provides the DSS already in use for the farmers' network afferent to **Barilla** itself.
- The experience and skills of **UNIVLEEDS** in the stakeholders' engagement, already pointed out in several initiatives (FP7 EUPORIAS, C3S SIS SECTEUR and CDS QA4Seas) perfectly fit and provide added values in the key activities of interface with the MED-GOLD community planned in WP5
- The strong involvement of **GMV** with DG GROW on Requirements Framework For The Next Generation Of The Copernicus Space Component and their overall experience in stakeholders involvement and market analysis (for instance, in ESA and GMES programmes), will effectively support the WP6 overarching activities of communication and exploitation of the value chain of MED-GOLD.
- At the coordination and management level (WP7), **ENEA** exhibits wide multidisciplinary expertises on climate services, climate and agroecosystem modelling that well fits with the role of overall coordinator. Recently, **ENEA** has successfully coordinated the FP7 project CLIM-RUN on the climate services in the Mediterranean region, contributing to several initiatives on climate services since the first experiences (FP6 CIRCE, AMMA, FP7 IMPACT2C, SPECS, EUPORIAS) up to the ongoing initiatives like CRESCENDO and the C3S Sectoral Information System tender (ECM). In the agricultural and ecological sectors, ENEA has also a strong experience in participation to FP7 projects such as GlobalChangeBiology to design and maintain sustainable agroecosystems in the Mediterranean basin increasingly disrupted by global change in the form of agro-technical inputs, invasive species, and climate change.

### 3.3.2 Complementary expertises in the MED-GOLD consortium

The expertise of the MED-GOLD consortium encompasses social sciences, European and international policy, macro-economic modeling, agronomy, agricultural science, climate impact science, climate services and modeling.

#### *Climate Science*

**BSC** and **MetOffice** will bring into the project a wealth of expertise in the field of seasonal to decadal global climate predictability by also considering bio-climatic indicators of interest. In the field of climate change, **NOA** will use and process data from global climate models in order to obtain a better estimate of the future climate change of the earth. **ENEA** is leading the initiative Med-CORDEX on the high resolution regional climate modeling for the Euro-Mediterranean area. Such a wealth of data will be turned into information following a pathway well established and tested in the past initiatives

#### *Agro-ecosystem models*

**ENEA** will develop the weather-driven physiologically based demographic modeling approach (PBDM, see <http://www.casasglobal.org/>) for the olive/olive fly system in WP2. Moreover, through the related third party **CREA**, the ENEA model will be further improved to become more realistic and reusable in the olives/olive oil pilot services. In WP6 the same PBDM model will be also used by **UMNG** to exploit the possibility of replicate the same flow of information also for coffee production in Colombia. **JRC** will use the yield forecast system MARS in WP4. **CNR** will perform an analysis of all components of Barilla's modelling wheat forecasting system to identify knowledge gaps and critical phases where seasonal forecast and monitoring data/tools could play a relevant role. In WP4, **HORTA** will operate the decision support system, testing the DSS functioning with seasonal weather forecasts as input and eventually improving it, and validate the functioning of the models currently implemented in its decision-support system (i.e. models for crop phenology, diseases, fertilization, etc.) with the seasonal weather forecast as input.

#### *Stakeholders engagement and market uptake*

The stakeholders' engagement, the identification of specific users needs and the assessment of the added value of the pilot services will be provided by the UNIVLEEDS. **GMV** will support the communication activities towards a wider audience, will produce the preliminary market analysis, demonstrate, together with UNIVLEEDS, the added value of the pilot services provided in WP2-4, and address the replicability issues (WP6).

#### *Stakeholders board*

The Stakeholders Board plays a particularly important role in MED-GOLD. It provides a wide representation of the three agri-food sectors, of potential European-level institutional users of climate services, and other projects that MED-GOLD activities are foreseen to cluster with. For the grape and durum wheat pilots, stakeholders who are already involved in the supply chain of the industrial partners of the project (DCOOP and Barilla) have been

already engaged during the preparation of the proposal and will be involved during the design and testing phase of the new tools to be developed during the project.

**Table 3.3.1a: MED-GOLD Stakeholders board already confirmed in the submission phase**

Stakeholders Board			
	Name	Country	Role
	ADAPT2CLIMA	International	Cluster Activity
	Olivemiracle	Italy	Cluster Activity
	Sociedad Científica Latinoamericana de Agroecología	Chile	Cluster Activity
	Basque Culinary Center	Spain	Institutional User
	Regionalna Razvojna Agencija Međimurje	Croatia	Institutional User
	International Olive Council	International	Institutional User
	Agrivendita	Italy	Durum Wheat/Pasta
	CON.CER. Società Cooperativa Agricola	Italy	Durum Wheat/Pasta
	Consorzio Agrario Ravenna	Italy	Durum Wheat/Pasta
	Francescon	Italy	Durum Wheat/Pasta
	P.P. La Marca Grains	Italy	Durum Wheat/Pasta
	ADVID	Portugal	Grapes/Wine
	Federación Española del vino	Spain	Grapes/Wine
	Consejo Regulador D.O. Rías Baixas	Spain	Olives/Olive oil
	Cooperativas Agro-Alimentarias	Spain	Olives/Olive oil

#### *Innovative technical solutions*

**EC2CE** will implement a machine learning method to model olive yield and olive fruit fly infestation in WP2. **Beetobit**, in collaboration with **UTH**, will implement the ICT platform in a horizontal way to be used as back-to-front end for all the activities of the project, from the integration of pilot services to the dissemination activities. **UTH** will be responsible for developing smart sensing solutions as well as to enable the collection of the attained measurements over an intelligent back-bone network in the upscaling of the pilot services for oil and wine sector over the Thessaly region, that we consider as a ‘local’ laboratory to validate and further upscaling of the main outcomes of WP2-3.

#### *Training and Communication activities*

Activities will also be developed for capacity building and training of users, going beyond the partnership established for this project, through the implementation of thematic webinars in WP5 by **BSC** (which have an extensive experience in this kind of dissemination activities) along with a comprehensive training programme aiming to harmonize competencies and to ensure common comprehension of produced information along the whole chain (WP6). The MED-GOLD training programme will be defined and implemented building on experience and knowhow of partners in training. **CNR** is a Training Center acknowledged by the World Meteorological Organisation as a Regional Training Center (RTC). Furthermore **ENEA**, **MetOffice**, and the **UNIVLEEDS** have recently organized the EUPORIAS Climate Services master classes where, in an hand-on formula, different communities (climate scientists/ users /local administrations) met together to co-develop prototypes of climate services for different sectors (water, agriculture, energy, tourism, food security and health).

#### *Industrial Problem-holders*

Additionally, the consortium has strong links with end user organisations, many of which will be involved in the project's activities. The central role of stakeholders in the structure of MED-GOLD is well demonstrated by the number of Industrial partners (the MED-GOLD Champions) who are actively taking part in the project, with different roles and size of planned efforts depending on their nature and on the characteristics of the pilot services they are in charge of co-designing and co-developing. For instance, in WP3 (grape/wine pilot service) we have a clearly-defined user, **SOGRAPE**, with a specific problem to be tackled, while in WP2 (olives/olive oil) **DCOOP** represent a large cooperative of more than 75000 Spanish farmers. In the WP4 (durum wheat/pasta) the situation is further different as **Barilla** does not produce crops at all, but they buy durum wheat to be transformed in pasta through a network of farmers and on the market directly, taking advantage of technical support from **HORTA** and **CNR**, both present in the consortium. The different nature of the Industrial partners allow the Consortium to tailor each pilot services in a different way, reflecting the peculiar decision-making process underlying each MED-

GOLD pilot services. The presence of such so relevant industrial partners allow the consortium to have a relevant ‘gateway’ for their associated networks of users, possibly engaged in the MED-GOLD Community (WP5) of stakeholders to validate and upscale the MED-GOLD core services.

### 3.4 Resources to be committed

MED-GOLD has a total duration of 4 years. It requires a total person month contribution of person months corresponding to full-time equivalent (Table 3.4a). The project is quite complex and characterised by a very high level of innovative and novel solutions in the field of climate services, and the partners will have different roles and weights in the WPs and in the tasks.

The majority of the funding for MED-GOLD is required for personnel costs, as the project will be relying on the skills and many years of expertise of the partner organisations involved. Therefore, it was key that the budget was calculated using an estimation of costs associated with the experts identified to deliver the project’s objectives, and their role within the project. Thus, as the tasks and description of the work packages developed; the associated estimate of personnel resources developed. This iterative approach to calculating the required budget to deliver the work packages and MED-GOLD as a whole will ensure a good estimate of the resources required, and associated funding required. Partners were asked to estimate their own travel budget and other costs required (e.g. to cover hosting and conducting workshops). These requests were then challenged and compared to ensure consistency. When considering the travel required in this project, all partners and stakeholders will, as best practise, avoid unnecessary travel, and use alternative forms of communication

The different nature of the MED-GOLD pilot services developed in WP2-4 is reflected in the different PM efforts requested to fulfill the peculiar activities for each MED-GOLD sector, as the overall idea of climate services means different things for different users. Even the climate information pathways are different in the three sectors and peculiarities should be taken into account to understand the intrinsic differences in the resources to be committed in the pilot services WP. For instance, in WP2 the problem-holder (namely, DCOOP) takes advantage of the expertise of EC2CE as ‘technical’ interface with the climate information, while in WP3 the high level of awareness and expertise that SOGRAPE has ‘in house’ allow them to ingest directly the climate information provided by the scientific partners. In WP4 Barilla is a co-leader even if the PM efforts is relatively low. This reflects their key role of problem-holders and main responsible of the co-design of pilot service. However, they benefit of the long-standing technical collaborations with HORTA and CNR who usually provide them the technical support in the effective implementation and improvements of the DSS for sustainable durum wheat production and for forecasting yields and protein content. Therefore, the most part of the technical activities needed to develop the pilot service on durum wheat/past will be made by HORTA and CNR

#### 3.4.1 Third parties

As the complex and highly multidisciplinary structure of MED-GOLD, some activities will be delivered by a third party, taking advantage of already existing links and ongoing collaborations to tackle the quite different activities needed to fulfill the ambitious objectives of MED-GOLD

The “Consiglio per la ricerca in agricoltura e l’analisi dell’economia agraria”, **CREA** (Council for Agricultural Research and Economics, [www.crea.gov.it](http://www.crea.gov.it)) is the largest Italian research organization in agriculture. This group will work in close collaboration with ENEA on improving the yield component of the model adopted by ENEA in WP2 (PBDM) for modelling the olive production. In general, CREA provides MED-GOLD extensive expertise on the physiology and ecology of crop systems, including the interactions with the climate system. CREA contributes to the project as a third party based on a Memorandum of Understanding (MoU) with the Food and Agriculture Organization of the United Nations (FAO) and ENEA. The MoU recognizes that FAO, CREA and ENEA have a history of close collaboration, particularly in areas such as integrated pest managements, and the MED-GOLD project will foster better access and exchange of information, knowledge and expertise in the field of food and agriculture sustainability that can benefit the services that FAO provides to its Members within the framework of the Strategic Objectives of the Organization. This will increase the international dimension of the MED-GOLD, extending its potential benefit to developing countries. More in detail, CREA will review how photosynthesis and yield are currently modelled in the PBDM, in order to identify areas for improvement that would make the model more realistic and usable/useful in the perspective of the MED-GOLD pilot service on olives/olive oil (WP2)

Budget: 65,000€

#### Subcontracts

**ENEA**, as coordinator, will subcontract to a specialised company to be identified at the early stage of the project, the development of the external web site and the production of the communication material (brochure, leaflet, ...)

in the main languages of the consortium to help the interaction and the dissemination with local end-users. Budget 20,000€

Weather station maintenance (4 times per year), over Portugal, weather data remote recovery, quality assessment, validation and restitution through a web portal will be subcontracted by **SOGRAPE** for the duration of the project for WP3 activities. A yearly value of around 15 000 is considered judging from the cost SOGRAPE incurred in the last 3 years. Budget 60,000 €

**Table 3.4a: Summary of staff effort**

	<b>WP1</b>	<b>WP2</b>	<b>WP3</b>	<b>WP4</b>	<b>WP5</b>	<b>WP6</b>	<b>WP7</b>	<b>Total PM per Participant</b>
<b>1: ENEA</b>	7	31	9	2.2	4	5	<b>30</b>	88.2
<b>2: BARILLA</b>	3.84	0	0	<b>3</b>	2.88	2.45	1	13.17
<b>3: BEETOBIT</b>	9.12	19.12	3.84	3.84	0.96	4.8	0.96	42.64
<b>4: BSC</b>	7	10	<b>22</b>	10	11	12	1	73
<b>5: CNR</b>	6			23	4	3	4	40
<b>6: DCOOP</b>	6.8	<b>28.8</b>			4.8	6.2	1	47.6
<b>7: EC2CE</b>		40.6			1.9	4.8	0	47.3
<b>8: GMV</b>	12	5	5	5	10	<b>17</b>	8	62
<b>9: HORTA</b>				35	2	1		38
<b>10: JRC</b>	1			<b>33</b>	4	2	1	41
<b>11: METOFFICE</b>	<b>18</b>	1	1	1	1	2	1	25
<b>12: NOA</b>	5	<b>22</b>	7	7	6	11	1	59
<b>13: SOGRAPE</b>	3.4		<b>49</b>		8	6	1	67.4
<b>14: UMNG</b>	1					4	0	5
<b>15: UNIVLEEDS</b>	6	6	6	6	<b>41</b>	6	1	72
<b>16: UTH</b>	23				8	6	6	43
<b>Total Person Months</b>	109.16	163.52	102.84	129.04	109.54	93.25	56.96	764.31

#### Breakdown required

**Table 3.4b: 'Other direct cost' items (travel, equipment, other goods and services, large research infrastructure)**

<b>1. ENEA</b>	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel</b>	29000	Travel to attend workshops, shows and seminars for dissemination of project results and experiences to industry stakeholders and policy-makers.
<b>Other goods and services</b>	32000	Organization of sectoral workshop with farmers Organization of summer schools Field consumables for trials (fertilizers, irrigation equipment, etc) Publication costs ; audit
<b>Total</b>	61000	
<b>2. BARILLA</b>	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel</b>	8642	Travel to attend workshops, shows and seminars for dissemination of project results and experiences to industry stakeholders and policy-makers.
<b>Other goods and services</b>	11000	Organization of 2 sectoral workshop with farmers for the durum wheat sector: <ul style="list-style-type: none"> <li>1st workshop: to show the innovation-service defined in WP4 and identify testers for such innovation-service</li> <li>2nd workshop: to show testers' results regarding the innovation-</li> </ul>

		service.
<b>Total</b>	18642	
<b>7.EC2CE</b>	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel</b>	16400	Travel over Europe to attend workshops, shows and seminars for dissemination of project results and experiences to industry stakeholders and policy-makers.
<b>Equipment</b>	9750	Server for simulations
<b>Other goods and services</b>	5000	License, surveys,
<b>Total</b>	31150	
<b>9.HORTA</b>	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel</b>	27790	Travel over Europe to attend workshops, shows and seminars for dissemination of project results and experiences to industry stakeholders and policy-makers.
<b>Other goods and services</b>	5000	durum wheat field trials
<b>Total</b>	32790	
<b>13.SOGRAPPE</b>	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel</b>	34400	Here are comprised costs of one Sogrape team member attending each of international congresses of relevance for the project. Moreover, it considers costs of participation in workshops, shows and seminars for dissemination of project results and experiences to industry stakeholders and policy-makers.
<b>Other goods and services</b>	50000	Historical datasets from Portugal's IPMA (National Weather Service) and other agencies as needed to validate methods, models and calibrations. The data will be not available in the COPERNICUS CDS. A total value of 30 000 is considered, judging from the usual cost of historical datasets from IPMA and the number of stations that will be required. Replacement sensors for weather stations owned and operated by Sogrape whose data will be used for validation of seasonal forecasts. An yearly value of 5 000 is considered judging from the average of the past 5 years; data availability has always been above 80% and, in the last year, 90%.
<b>Total</b>	84400	
<b>14.UMNG</b>	<b>Cost (€)</b>	<b>Justification</b>
<b>Travel</b>	11000	Travel over Europe to attend workshops, shows and seminars for dissemination of project results and experiences to industry stakeholders and policy-makers.
<b>Other goods and services</b>		
<b>Total</b>	11000	



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## HORIZON 2020

**Programme:** Greening the Economy

**Priority / Objective:** H2020-SC5-1-2017: Exploiting the added value of climate services: From climate service concepts to piloting and proof-of-concept

**Project type:** Research and Innovation Action

**Project Title** Turning climate-related information into added value for traditional **MED**iterranean **G**rape, **OL**ive and **D**urum wheat food systems

**Project Acronym** **MED-GOLD**

### List of participants

Participant No *	Participant organisation name	Country
1	ENEA	Italy
2	Barilla	Italy
3	Beetobit	Italy
4	BSC	Spain
5	CNR	Italy
6	DCOOP	Spain
7	EC2CE	Spain
8	GMV	Spain
9	HORTA	Italy
10	JRC	EU
11	MetOffice	United Kingdom
12	NOA	Greece
13	SOGRAPE	Portugal
14	UMNG	Colombia
15	UNIVLEEDS	United Kingdom
16	UTH	Greece

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4.1.10 JRC ( <a href="https://ec.europa.eu/jrc/en">https://ec.europa.eu/jrc/en</a> ), Italy	27
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## Section 4: Members of the consortium

### 4.1. MED-GOLD Participants

#### 4.1.1 ENEA, ([www.enea.it](http://www.enea.it)), Italy



Agenzia nazionale per le nuove tecnologie, l'energia  
e lo sviluppo economico sostenibile

*Description of the legal entity and its main tasks, with an explanation of how its profile matches the tasks in MED-GOLD*

ENEA is the Italian government agency responsible for the areas of new technology, energy and the sustainable economy. Its two fundamental tasks are to conduct research in these areas and to diffuse the results nationally. ENEA's activities in the Environmental sector involve: Environmental surveying and monitoring; Climate modelling and analysis at global and regional scale; Global change assessment; Research and assessment of the impact of productive activities on the human and natural environments; Development of advanced technologies and new products with low environmental impact. The Agency has around 3000 staff throughout Italy, operating at nine major Research Centres and a number of smaller facilities.

**ENEA has a special laboratory devoted to Climate Modelling and Impacts (SSPT-MET-CLIM)** with a staff of 15 employees. This laboratory combines long standing expertise both in the area of oceanic and atmospheric modelling (regional and global) and impact evaluation in relevant sectors (energy, infrastructure, agriculture, ecosystems). Its major fields of research are Mediterranean and African climate, the analysis of the regional hydrological cycle and related teleconnections, energy and environmental modelling, forecasting applications for renewable energy, electric grid, infrastructure maintenance and planning.

The SSPT-MET-CLIM laboratory coordinated the EU-FP7 CLIM-RUN project on climate services, and it participated to IMPACT2C, SPECS and EUPORIAS, SINGULAR, PERSEUS EU-FP7 projects. Now it's involved in CRESCENDO H2020 project and in C3S tended ECEM on climate services for energy sector in Europe. This laboratory co-leads and participates to Med-Cordex initiative, where also contributes with the ENEA regional earth system model climate simulations for the Mediterranean basin.

**The other ENEA laboratory involved in the present proposal is SSPT-BIOAG-SOQUAS (Laboratory for sustainability, quality and safety of agro-food production)** and its parent division SSPT-BIOAG have developed environmentally-friendly approaches to manage key pest problems in Mediterranean agro-ecosystems for about four decades. One relevant and important example is the integrated pest management (IPM) initiative to control olive pests in the hills surrounding Canino, a small town in central Italy (initiative funded by the EU under the Impresa project<sup>1</sup>). Initiated by ENEA in 1979, the Canino project was demand-driven and implemented through a multi-stakeholders platform. According to a [recent study](#)<sup>2</sup> done under Impresa by FAO's Research and Extension Unit, the implementation of IPM was instrumental in increasing olive productivity and reducing pesticide overuse in Canino (VT). The SSPT-BIOAG-SOQUAS lab and its parent division have extensive expertise in leading and participating national (RIADE, see <http://www.riade.net>) and international projects (DESERTNET, see <http://www.desertnet.org/>; DESERTWATCH, see <http://dup.esrin.esa.it/desertwatch/>; LUCINDA, IMAGE and DESURVEY) with a Mediterranean focus. The SSPT-BIOAG-SOQUAS lab collaborates closely with the SSPT-MET-CLIM lab, and provides a multidisciplinary research environment that includes agronomists, biologists, chemists, physicists, geologists, information technologists, engineers, mathematicians, naturalists, and sociologists. In

<sup>1</sup> <http://www.impresa-project.eu/contrast/research-steps/case-studies-of-science-based-innovation-in-agriculture-and-food-systems-wp3/italy-integrated-pest-management-on-olive-production.html>

<sup>2</sup> <http://www.fao.org/nr/research-extension-systems/res-home/news/detail/en/c/425771/>

working on the heterogeneous desertification processes occurring in the Mediterranean Basin, ENEA has developed an interdisciplinary approach to the analysis of complex ecological problems in the face of global change as well as an extensive network of international collaborations (see websites above). ENEA has already succeeded in solving many complex issues related to the analysis of climate and desertification in agriculture, and therefore has all the infrastructures, facilities, and expertise required for the present project: this greatly increases the likelihood of success of MED-GOLD.

#### *Role description*

ENEA is the scientific and administrative manager of MED-GOLD, overseeing all the coordination activities, following continuously the MED-GOLD workflow and assuring the overall quality of the research and the main MED-GOLD outcomes. ENEA will work on the use of climate projections in the climate services for agricultural sector in WP1, Wp2-4. Moreover, they contribute in the development of pilot services on olives/olive oil, by adopting the PBDM model to simulate the major interaction of olive tree with the main pests. Moreover, ENEA will take advantage of their existing links to validate an upscale (WP5) the olives/olive oil pilot service over Central Italy, in the olive consortium of Canino (VT). Finally, they host the external web site and organize the summer training events foreseen in WP6.

#### *Curriculum vitae or description of the profile of the persons, including their gender, who will be primarily responsible for carrying out the proposed research and/or innovation activities.*

**Alessandro Dell'Aquila (M)**, (Project Coordinator, MED-GOLD Science Coordination team) PhD in Geophysics, is a Permanent ENEA Researcher since 2009 (previously temporary staff researcher with similar duties). In charge of analysis and validation of the regional climate model employed at ENEA for the Euro-Mediterranean area. Current research interests are focused on the assessment of uncertainty of state-of-the-art climate models in reproducing climate processes at both global and local scales. Particular attention is also paid in providing climate information tailored on the end-users needs in the energy, tourism, agriculture sectors. He has participated to several EU projects (CIRCE, AMMA, CLIM-RUN, IMPACT2C, SINGULAR, PERSEUS SPECS, EUPORIAS (as ENEA PI and WP leader in the WP11 about vulnerability assessment framework activity), H2020 CRESCENDO and NEXTDATA projects. Involved in the coordinated modelling experiment for the Euro-Mediterranean region Med-CORDEX (ENEA Contact point), in the European Climate Research Alliance (ECRA) and in European Climate Service Partnership (ECSP) initiatives. Author of 38 peer reviewed papers (up to 2015), and more than 30 international conference contributions. H-index Scopus 2015: 15 (Google 19) . Convener of scientific session about "Climate services – Underpinning science" at EGU General Assembly and convener of the scientific session about "Atmospheric dynamics and predictability" at EMS General Assembly. Member of WMO Joint CBS/CCI Expert Team on Operational Predictions from Sub-seasonal to Longer-time Scales (ET-OPSLS).

**Sandro Calmanti (M)** (MED-GOLD Science Coordination team) has a degree in Physics and PhD in Environmental Engineering. His scientific production ranges from theoretical studies in ocean dynamics to the characterization of atmospheric weather regimes and the assessment of global climate models. He has contributed to the implementation of regional Earth System Models for climate change studies at ENEA and at MétéoFrance. He has contributed as climate and climate impact modeller to the FP7 EU Projects CLIM-RUN, IMPACT2C (as WP leader for the climate impact activities for the vulnerable areas), SPECS and EUPORIAS

**Luigi Ponti (M)** (MED-GOLD Science Coordination team) holds a MS in Agricultural Sciences (cum laude) and a PhD in Agricultural Entomology from the University of Perugia (Italy). He is Research Scientist and formerly Marie Curie Fellow at ENEA, Rome where he received an International Reintegration Grant from the European Union (see <https://goo.gl/L9juiC>) following his postdoctoral tenure at the University of California, Berkeley where he participated in the analysis of the effects of climate warming on major crop-pest systems in California (alfalfa, cotton, grape, olive, and the rangeland weed yellow starthistle, see <https://goo.gl/0rOQMm>) as part of the first "Climate Scenarios" analysis commissioned by the California government (see <https://goo.gl/Tjhbpd>). See also his <http://orcid.org/0000-0003-4972-8265>

**Matteo De Felice (M)** (MED-GOLD Science Coordination team) is currently staff scientist at the Climate Impacts and Modelling laboratory in the ENEA Research Centre in Bologna. He has a Ph.D. in Informatics and Automation, which revolved around the application of nature-inspired optimisation and modelling methods (namely evolutionary algorithms or ensemble of neural networks) to energy-related problems. In 2011, he moved to his current laboratory, and since then he has been taking advantage of my background in data-driven modelling and machine learning to deal with several real-world applications where weather and

climate play an important role. He was the supervisor of the ENEA service for the Dispatching Office of TERNA, the Italian TSO, and he is the ENEA supervisor for the C3S ECEM project. He was also involved in CLIM-RUN, SPECS and EUPORIAS FP7 projects.

**Sergio Musmeci (M)** is a biologist and PhD in Plant Protection. He works as a permanent ENEA researcher since 2010 in the field of applied entomology and integrated pest management. Expertise: He has acquired expertise in the evaluation of natural plant defenses, statistical analyses and modeling. In the last years he dealt with exploratory analysis and statistical modeling to develop new predictors and tools for the seasonal climate forecast in Europe and Mediterranean areas [Seasonal Climate Forecasts for Agriculture (CSAgri), <http://www.enea.it/it/ateco> (Code ATECO A01, cluster AGRIFOOD)]. Research Projects: focused on management of crop pests of economic importance and on the new emerging pest species. Funding Institutions: Italian Ministry of Agricultural, Food and Forestry Policies; United States Department of Agriculture; International Atomic Energy Agency.

**Maurizio Calvitti (M)**. Permanent ENEA Staff scientist, holds a degree in Biological Science from University of Rome La Sapienza and a Ph.D. in Ecology and Management of Biological Resources from University of Tuscia, Viterbo (Italy). Main relevant Research Projects: 1) European Concerted Action "The European Whitefly Studies Network" with the aim to develop organic-integrated control systems for greenhouse whiteflies; 2) Appointed Scientific Coordinator of the National Research Project "Inagrimed" (Integrated Researches for Innovation of typical Mediterranean food chains) that carried out research on both olive oil and vegetable production systems; 3) Responsible for ENEA of a contract awarded by FAO as part of the European project "IMPRESA" for support in the study of technological and socio-economic impact of research, development and technology transfer in previous project on integrated pest management in olive in Canino (Italy). Co-author of about 80 scientific publications and a referee for several scientific journals (Trends in Parasitology, Entomology et experimentalis applied, Journal of Insect Behaviour and Molecular Ecology). In 2009 he was co-author of an ENEA patent for the development of a sterilization process of the asian tiger mosquito *Aedes albopictus* males achieved through altering the pattern of *Wolbachia* infection in females.

*List of up to 5 relevant publications, and/or products, services (including widely-used datasets or software), or other achievements relevant to MED-GOLD;*

1. Gutierrez A.P., Ponti L., 2013. Eradication of invasive species: why the biology matters. *Environmental Entomology*, 42: 395-411. doi:10.1603/EN12018
2. Ponti L., Gutierrez A.P., Ruti P.M., Dell'Aquila A., 2014. Fine-scale ecological and economic assessment of climate change on olive in the Mediterranean Basin reveals winners and losers. *Proceedings of the National Academy of Sciences*, 111: 5598-5603. doi:10.1073/pnas.1314437111
3. Ponti L., Gilioli G., Biondi A., Desneux N., Gutierrez A.P., 2015. Physiologically based demographic models streamline identification and collection of data in evidence-based pest risk assessment. *EPPO Bulletin*, 45: 317-322. doi:10.1111/epp.12224
4. Ruti P, Somot S, Giorgi F, Dubois C, Flaounas E, Obermann A, Dell'Aquila A, Pisacane G, Harzallah A, Lombardi E, Ahrens B, Akhtar N, Alias A, Arsouze T, Aznar R, Bastin S, Bartholy J, Beranger K, Beuvier J, Bouffies-Cloche S, Brauch J, Cabos W, Calmanti S, Calvet JC, Carillo A, Conte D, Coppola E, Djurdjevic V, Drobinski P, Elizalde A, Gaertner M, Galan P, Gallardo C, Gualdi S, Goncalves M, Jorba O, Jorda G, Lheveder B, Lebeaupin-Brossier C, Li L, Liguori G, Lionello P, Macias-Moy D, Onol B, Rajkovic B, Ramage K, Sevault F, Sannino G, Struglia MV, Sanna A, Torma C, Vervatis V (2015) MED-CORDEX initiative for Mediterranean climate studies. *Bull Amer Meteor Soc*. doi:10.1175/BAMS-D-14-00176.1
5. Dell'Aquila, A., Mariotti, A., et al. (2016), Evaluation of simulated decadal variations over the Euro-Mediterranean region from ENSEMBLES to Med-CORDEX Clim Dyn doi:10.1007/s00382-016-3143-2

*List of up to 5 relevant previous projects or activities, connected to the subject of MED-GOLD;*

- CLIM-RUN (FP 7 project) aimed at developing a protocol for applying new methodologies and improved modeling and downscaling tools for the provision of adequate climate information at regional to local scale that is relevant to and usable by different sectors of society
- The EUPORIAS project (FP7 project) has developed and delivered reliable predictions of the impacts of future climatic conditions on a number of key sectors (to include water, energy, health, transport,



agriculture and tourism), on timescales from seasons to years ahead, through a strong engagement with the forecast providers and the users/decision-makers, who were both represented within the project

- SPECS (FP7 project) aimed to identify the main problems in climate prediction and investigate a battery of solutions from a seamless perspective. SPECS undertook research and dissemination activities to deliver a new generation of European climate forecast systems, with improved forecast quality and efficient regionalisation tools to produce reliable, local climate information over land at seasonal-to-decadal time scales, providing an enhanced communication protocol and services to satisfy the climate information needs of a wide range of public and private stakeholders.
- IMPACT2C (FP7 project) has enhanced knowledge, quantifies climate change impacts, and adopts a clear and logical structure, with climate and impacts modelling, vulnerabilities, risks and economic costs, as well as potential responses, within a pan-European sector based analysis. IMPACT2C utilised a range of models within a multi-disciplinary international expert team and assesses effects on water, energy, infrastructure, coasts, tourism, forestry, agriculture, ecosystems services, and health and air quality-climate interactions
- GlobalChangeBiology (FP7 project titled “A physiologically-based weather-driven geospatial modeling approach to global change biology: tackling a multifaceted problem with an interdisciplinary tool”) Analytical tools that provide a synthesis of ecological data are increasingly needed to design and maintain sustainable agroecosystems increasingly disrupted by global change in the form of agro-technical inputs, invasive species, and climate change. This is particularly relevant to the Mediterranean Basin, a climate change hot-spot already threatened by local environmental changes including desertification. The project provided important tools for summarizing, managing, and analyzing ecological data in agricultural systems to address global change effects using grape and olive as model systems. The project integrated weather driven physiologically based Ecosystem Modelling (EM) and Geographic Information Systems (GIS) to derive a dynamic understanding of complex agricultural systems in the face of global change including climate warming. Multivariate analyses were used to summarize the main effect of model predictions in a space and time independent way to provide a solid but flexible basis for managing Mediterranean grape and olive systems in a changing global environment. The integrated EM/GIS system may be viewed as a library of the current knowledge about agroecosystems that can be extended to other systems, updated with new knowledge and used to help guide multidisciplinary research on local and regional scales. The need for extensive weather datasets to drive the models requires that the EM/GIS technology be linked with remote sensing (RS) to enhance spatial resolution of the approach and increase its real-world applications. This combined innovative EM/GIS/RS tool will provide European governmental agencies with the scientific basis for developing policy required to adjust to global change including climate warming. The project contributes to the European Climate Adaptation Platform (CLIMATE-ADAPT, see <https://goo.gl/FEPBXG>)

### *Third parties involved in the project (including use of third party resources)*

For parts of the modelling activities requested in WP2, it operates under the supervision of the Ministry of Agriculture, with general scientific competence within the fields of agriculture, agroindustry, food, fishery, forestry and agricultural economics.

CREA employs about 1600 people, of which about 600 research scientists. CREA's research centers are well distributed over the nation, though the number is changing due to the current re-organization, which envisions 12 centers, each with multiple headquarters, including experimental farms, over the national territory.

The principal investigator for CREA (Dr. Adolfo Rosati) works at the CREA research center on Olive Research in Spoleto, which is equipped with a portable gas exchange laboratory (LICOR 6400, LICOR, Nebraska, USA) for field research on olive photosynthesis. ENEA will take advantage of the expertise of The “Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria”, **CREA** (Council for Agricultural Research and Economics, [www.crea.gov.it/](http://www.crea.gov.it/)), the largest national (Italy) research organization in agriculture.

Adolfo Rosati holds a PhD in Physiology of cultivated plants. Since 1996 he has worked as a research scientist (senior research scientist as of 2008) at CREA (formerly CRA and other denominations before that). He has worked both on vegetable crops and, since 2004, on olive. He has worked abroad for extensive periods of time, for a total of over 5 years, including at University of Davis, California (USA), at the Horticultural Research International, Wellesbourne (UK), at the CSIC, Cordoba (Spain), and he is currently

working at the Agroforestry Center of the University of Missouri (UMCA) as a Fulbright fellow, until June 2017. He obtained Funding and was the principal investigator for CREA in several International, national and regional projects, including the ENVEG project (5th FP) and the AGFORWARD project (VII FP) funded by the EU. He is author of over 150 articles including articles in peer review international journals, articles in dissemination journals, books, conference proceedings, project videos and other materials. His main research topics include, ecophysiology (light use and photosynthesis, radiation use efficiency modelling, partitioning and harvest index), floral biology, and agroforestry (sustainable farming, mixed crops and mixed crops/animals).

CREA contributes to the project as a third party based on a Memorandum of Understanding (MoU) with the Food and Agriculture Organization of the United Nations (FAO) and ENEA. The MoU recognizes that FAO, CREA and ENEA have a history of close collaboration, particularly in areas such as integrated pest managements, and the MED-GOLD project will foster better access and exchange of information, knowledge and expertise in the field of food and agriculture sustainability that can benefit the services that FAO provides to its Members within the framework of the Strategic Objectives of the Organization.

#### 4.1.2 Barilla (<http://www.barillagroup.com/>), Italy



##### *Description of the legal entity and its main tasks, with an explanation of how its profile matches the tasks in MED-GOLD*

Barilla G. & R. Fratelli S.p.A. is a food Company founded in 1877, market leader in the production of pasta meals, sauces and bakery products. Products are made in 41 production sites, in 9 different countries and are exported in more than 100 countries worldwide. Barilla is Europe's largest user of durum wheat (more than 1.400.000 tons/year) and one of the most relevant for common wheat flour. Barilla is also an important player in the rye and tomato markets in Northern Europe and in Italy, respectively.

The company is strongly integrated in the durum wheat production chain with: proprietary mills (7), pasta plants (8) and Identity preserved agreements with suppliers.

Barilla developed strong expertise and competencies in durum wheat production forecasting and assessment, grain quality evaluation and food safety risk assessment and management at local, regional and global scale.

Barilla has strong experience in durum wheat supply chain worldwide and a large network of suppliers (farmers and storage facilities) to collect reliable information on durum crops.

Results arisen from Barilla research related to previous and ongoing projects, enabled the development of a deterministic model to forecast yields and protein content in main durum wheat production basins along with the development of models for Fusarium and mycotoxin risk assessment. Both models are implemented in the Delphi System and applied by Barilla at national and global scale.

In addition, thanks to the long-standing collaboration with 'Horta srl', Barilla approached granoduro.net®, a Decision Support System (DSS) service for sustainable durum wheat production. Together with Horta, Barilla studied the cultivation and sustainability efficiency of granoduro.net® at the experimental stage in several durum wheat cultivation areas.

As a result of quite encouraging and positive achievements (e.g. carbon and water footprints' reduction; farmers' income increase), Barilla subscribed cultivation contracts associated to the use of granoduro.net® with its durum wheat suppliers.

##### *Role description*

- Barilla will contribute to WP1 by providing a general overview of the durum wheat sector and by describing activities and projects regarding its GYGPGC (Good for you, Good for the Planet, Good for the Communities) mission.
- In WP4, Barilla will contribute by supporting Horta activities, the initial workshop (targeted at durum wheat producers), the pilot project evaluation and the quantification of the potential impact of 'seasonal weather forecasts' on durum wheat production systems.
- In WP5, Barilla will organise the second and final workshop (targeted at durum wheat producers and other potential stakeholders) to show them the 'seasonal weather forecasts' innovation results.
- Finally, in WP6, Barilla will contribute by supporting the dissemination of the 'seasonal weather forecasts' innovation results.

##### *Curriculum vitae or description of the profile of the persons, including their gender, who will be primarily responsible for carrying out the proposed research and/or innovation activities.*

**Dr. Chiara Monotti (F)**, BSc+MSc in Agricultural Science and Technologies (Italy), MSc in Food Economics and Marketing (UK), PhD in Sustainable Rural Development: SCMI-Purchasing Senior Manager, Responsible for market intelligence research in Barilla since 7 years. Previous experience in UN-FAO, Universities (IT, UK, NL), Italian Embassy, Italian Trade Commission, UK companies. Research activities on sustainable rural development, organic & fair trade sectors, CSR, commodities, price forecasting and agri-food markets.

##### *List of up to 5 relevant publications, and/or products, services (including widely-used datasets or software),*



*or other achievements relevant to MED-GOLD;*

Toscano, P., Genesio, L., Crisci, A., Vaccari, F.P., Ferrari, E., Cava, P.L., Porter, J.R., Gioli, B. Empirical modelling of regional and national durum wheat quality. 2015 Agricultural and Forest Meteorology, 204, pp. 67-78. DOI: 10.1016/j.agrformet.2015.02.003

Blasi, E., Monotti, C., Ruini, L., Landi, C., Avolio, G., Meriggi, P., Eco-Innovation as a driver in the agri-food value chain: an empirical study on durum wheat in Italy. 2014 Journal on Chain and Network Science, 15(1), 1-15, ISSN 1875-0931 online, DOI 10.3920/JCNS 2014.x014

Toscano, P., Gioli, B., Genesio, L., Vaccari, F.P., Miglietta, F., Zaldei, A., Crisci, A., Ferrari, E., Bertuzzi, F., La Cava, P., Ronchi, C., Silvestri, M., Peressotti, A., Porter, J.R. Durum wheat quality prediction in Mediterranean environments: From local to regional scale. 2014 European Journal of Agronomy, 61, pp. 1-9. DOI: 10.1016/j.eja.2014.08.003

Toscano, P., Ranieri, R., Matese, A., Vaccari, F.P., Gioli, B., Zaldei, A., Silvestri, M., Ronchi, C., La Cava, P., Porter, J.R., Miglietta, F. Durum wheat modeling: The Delphi system, 11 years of observations in Italy. 2012 European Journal of Agronomy, 43, pp. 108-118. DOI: 10.1016/j.eja.2012.06.003

Pascale M., Haidukowski M., Lattanzio V.M.T., Silvestri M., Ranieri R., Visconti A. (2011). Distribution of T-2 and HT-2 Toxins in Milling Fractions of Durum Wheat. Journal of Food Protection, Vol. 74, No. 10: 1700–1707

*List of up to 5 relevant previous projects or activities, connected to the subject of MED-GOLD;*

1. 'SIGRAD project' (MIPAF DM 2/8/2003): to improve Italian durum wheat competitiveness
2. 'SINPREF project' (Integrated System for Durum Wheat quality and production forecast - FRA project D.M. n° 954-8/8/97): for the development of a deterministic model to forecast yields and protein content in main durum basins in Italy
3. 'SInSIAF' (Integrated System for food safety management in the durum wheat industry - MIUR Project n. 12792 2000-2006): development of a model for Fusarium and mycotoxin risk assessment in Italy
4. 'Climate ChangE-R' (Reduction of greenhouse gases from Emilia Romagna agricultural system – LIFE+ LIFE12/ENV/IT/404): reduction of GHG emissions of Emilia Romagna agricultural system through efficient mitigation using best cropping practices as durum wheat granoduro.net® DSS application

*Description of any significant infrastructure and/or any major items of technical equipment, relevant to MED-GOLD proposed work;*

Barilla R&D headquarter is located in Parma, employs 196 peoples, most of which are graduated (60%) or with a degree. Several facilities are available in 8,100 square meters to support R&D activities on raw materials and final products.

Barilla developed, in collaboration with CNR-IBIMET, an exclusive forecasting system, called "DELPHI", based on climatic conditions using own meteorological stations network, public data and satellite images, soil characteristics and agronomic practices, used to prevent food safety issues and durum wheat related risks.

The Delphi system, calibrated for each pedoclimatic factor affecting durum wheat during phenological development, is an innovative system capable of predicting spatial yield variation and temporal yield fluctuation in long-term analysis.

The model was validated and evaluated for past conditions and then used in operational mode since 1999, showing an excellent/good accuracy in predicting grain yield even before maturity for a wide range of growing conditions in the Mediterranean climate, governed by different annual weather patterns.

Further EO information for crop mapping, retrieval of surface parameters and crop forecast are based on algorithms already developed, implemented and integrated into Delphi System by Barilla and CNR researchers.

There are chemical, physic, microbiological and nutritional laboratories provided with the most advanced instruments for analytical detections (i.e. spectrophotometers, GC, MS, HPLC, FPLC, CZE, DSC, NIR System), for rheological tests (i.e. RVA, Instron, SMS, viscosimeters, mixographs, alveographs, etc) and structural investigations (i.e. optical microscopes, SEM, colorimeters, etc)

Pasta and bakery pilot plants are also present with a large variety of different machines required in production processes, such as mixers (traditional, vacuum, steam heated, N2 or CO2 cooled, etc.), extruders (die-plates, one and twin screws, etc.), cutting machines, ovens (electrical, steam, combustion or MW

powered, etc.) and dryers (static, vacuum, air forced, MW, etc.). A pilot and a semi-industrial durum wheat mill are also available to test and to scale-up mill process upgrading.

#### 4.1.3 BeeToBit (<http://www.beetobit.com>), Italy



##### *Description of the legal entity and its main tasks, with an explanation of how its profile matches the tasks in MED-GOLD*

BeeToBit is an innovative company focused on building scalable modern computing platforms for companies, public sector and research institutes. Each one of the company's founders has twenty or more years of hands-on high level experience in the field of ICT, in research institutes (CRS4, ESO-ESA/Hubble), enterprises (Tiscali SpA), and the public sector (Sardinia, IT). We leverage that knowledge and experience to inform our vision of ICT: a field not focused on programs and apps anymore, but on the concept of sharing, collaboration and mix-up of different data and computation resources, working together at scale to compose a dynamic system far greater, and more useful, than the sum of the single components.

To achieve our vision, we invest heavily on the enabling technologies of the **public cloud**, which allows us to allows us to foster innovation by using world-class scalable IT resource, paying them on a per-use basis; **data technologies**, including both SQL and no-SQL databases using different paradigms, including graph, document and key/store databases, using them in real world situations, at scale, for critical applications, including large clustering deployments and big data scenarios; **high-scale computing**, achieved through modern high-level cloud enabled languages, primarily Python and NodeJS, and use of distributed APIs, microservices, and serverless components, such as AWS Lambda.

##### *Role description*

BeeToBit will: a) provide ICT expertise for the creation of the general infrastructure for the project (data storage and normalisation, model execution, etc)), b) design and implement software for specific applications, mainly PBDM for olive oil; c) provide maintenance and support for said ICT services and resources, both cloud-bases, hybrid or on-premises, throughout the duration of the project.

##### *Curriculum vitae or description of the profile of the persons, including their gender, who will be primarily responsible for carrying out the proposed research and/or innovation activities.*

**Federico Caboni** (M). Started working as a freelance developer in 1997; since 2001 he starts a long collaboration with CRS4 (Centre for Advanced Studies, Research and Development in Sardinia), working as a researcher, developer and system architect in the fields of e-government, multimedia, education technologies, clinical informatics and healthcare processes, through 2013. In 2009 he also collaborates with ESO/Hubble for developing of Portal to the Universe. In 2014 he's Application Development Manager at Energia Mediterranea, architecturing and leading the development of a cloud-based electrical smart grid. In 2015 he co-founds BeeToBit, assuming the role of R&D director, focusing on applying cloud-based and big data technologies to drive real world large-scale systems.

**Roberto Chessa** (M) Roberto started working as a System Engineer around 1999, managing high-scale IT systems at Tiscali IT for 8 years; in 2007 he become Systema Manager at Hoplo SRL, pioneering the use of then brand new public cloud technologies. He designed the Cloud infrastructure, both on AWS and Azure platforms, of Soundtracker, the music streaming startup. In 2015 he co-founds BeeToBit, where he's ICT director and Lead Cloud Architect. Roberto is an AWS Certified Solution Architect.

##### *List of up to 5 relevant publications, and/or products, services (including widely-used datasets or software), or other achievements relevant to MED-GOLD*

N/A

##### *List of up to 5 relevant previous projects or activities, connected to the subject of MED-GOLD*

N/A

##### *Description of any significant infrastructure and/or any major items of technical equipment, relevant to MED-GOLD proposed work*

N/A



#### 4.1.4 Barcelona Supercomputing Center (<https://www.bsc.es/>), Spain



**Barcelona  
Supercomputing  
Center**

*Centro Nacional de Supercomputación*

*Description of the legal entity and its main tasks, with an explanation of how its profile matches the tasks in MED-GOLD*

**The Barcelona Supercomputing Center (BSC)** was established in 2005 and is the Spanish national supercomputing facility and a hosting member of the PRACE distributed supercomputing infrastructure. The Center houses MareNostrum, one of the most powerful supercomputers in Europe. The mission of BSC is to research, develop and manage information technologies in order to facilitate scientific progress. BSC combines HPC service provision, and R&D into both computer and computational science (life, earth and engineering sciences) under one roof and currently has over 450 staff from 44 countries. BSC has collaborated with industry since its creation, and participates in various bilateral joint research centers with companies such as IBM, Microsoft, Intel, NVIDIA and Spanish oil company Repsol. The centre has been extremely active in the EC Framework Programmes and has participated in over 100 projects funded by it. BSC is a founding member of HiPEAC, the ETP4HPC and other international fora.

The ES-BSC activities with the focus on global climate modelling and prediction are based on research, development and predictions with the EC-Earth climate forecast system. EC-Earth is the state-of-the art coupled climate model that is being developed and used for climate predictions and projections by the European consortium of more than 20 research and operational institutions from European Centre for Mid-range weather Forecasts (ECMWF is provider of the atmospheric and land components) to ES-BSC. Beside contributing to the 5th phase of the Coupled Model Intercomparison Project (CIMP5) critical for the UN IPCC Fifth Assessment Report (AR5), global climate research activities at ES-BSC enable provision of various historical reconstructions and initial conditions to the EC-Earth community for analysis of climate dynamics and for seasonal to decadal climate predictions. The ES-BSC is a contributor to the IS-ENES FP7 European project fostering the integration of the European climate modelling community and the development of Earth System Models (ESM) for advancing the understanding and predictions of climate variability and change. The ES-BSC is already active in the planning and design of the future coupled climate model intercomparison project, CIMP6, and is preparing to make key contributions including the ground-breaking high-resolution climate simulations with EC-Earth.

*Role description*

For MED-GOLD, BSC undertakes research on the development and assessment of dynamical methods for the prediction of essential climate variables for agriculture. The formulation of the predictions includes the development and implementation of techniques to statistically downscale, calibrate dynamical ensemble forecasts to satisfy specific user needs in the framework of the development of a climate service.

*Curriculum vitae or description of the profile of the persons, including their gender, who will be primarily responsible for carrying out the proposed research and/or innovation activities.*

**Dr. Albert Soret Miravet (M). Group leader of the Earth System Services group.** Dr. Albert Soret holds a PhD in Environmental Engineering from the Polytechnic University of Catalonia (Barcelona). He is head of the Services group at BSC-ES. He is a postdoc researcher with 10 years of experience in earth sciences. His research focuses on assessing the impact of climate on socio-economic sectors through the development of user-oriented services that ensure the transfer of the technology developed and the adaptation to a rapidly changing environment. He is Work Package leader within the CLIM4ENERGY and MAGIC Copernicus projects. Between others, he is participating in EC-FP7, ERA-Net and H2020 projects: NEWA, EUPORIAS, SPECS, IMPREX and PRIMAVERA.

**Dr. Nube Gonzalez Reviriego (F). Post-doc.** Nube Gonzalez joined the Climate Investigation and Application Group (GICA) of the USAL under a FPI fellowship, where she holds an international PhD in

“Research and Development of Geotechnologies” in year 2015. Her Doctoral Thesis, entitled “Evaluación de las teleconexiones climáticas observadas y simuladas con modelos de CMIP en la región Euro-Atlántica” focus on Northern Hemisphere Teleconnections with outputs of Global Climate Models (GCM's) from CMIP3 and CMIP5 datasets. In year 2013 she started to work at Institut Català de Ciències del Clima (IC3) in the Climate Forecasting Unit (CFU) where she was involved in the development and communication of climate services for energy. Currently, Nube is working at BSC, where her research topic is to understand the forecast quality and the predictability sources of the most comprehensive set of sub-seasonal and seasonal probabilistic predictions of wind speed and temperature. She contributed to various national and European projects as RESILIENCE or EUPORIAS among other.

**Dr. Marta Terrado (F). Science communication for Earth System Services** Dr. Marta Terrado has a Master's degree in Geographical Information Systems from the Polytechnic University of Catalunya and a PhD in Earth Sciences from the University of Barcelona. She has six years post-doctoral experience in water management and ecosystem services research, and has been involved in various national and EU funded projects on water scarcity and adaptation to climate change. As a science communication officer in the Earth System Services group at BSC, she facilitates knowledge and technology transfer on climate services to end users. She is currently involved in EU funded projects embracing dissemination actions, user-engagement and interaction with stakeholders.

*List of up to 5 relevant publications, and/or products, services (including widely-used datasets or software), or other achievements relevant to MED-GOLD;*

1. Soret, A., González, N., Torralba-Fernandez, V., Cortesi, N., Turco, M., Doblas-Reyes, F.J., 2016. Climate predictions for vineyard management. CLIMWINE 2016 International Symposium. April 10-13, 2016. Bourdeaux, France.
2. Pavan, V. and F.J. Doblas-Reyes, 2013. Pavan, V. and F.J. Doblas-Reyes. Climate Dynamics, 41: 2115-2132.
3. Doblas-Reyes, F.J., J. García-Serrano, F. Lienert, A. Pintó Biescas and L.R.L. Rodrigues, 2013. Seasonal climate predictability and forecasting: status and prospects. WIREs Climate Change
4. Guemas, V., F.J. Doblas-Reyes, I. Andreu-Burillo M. Asif. 2013. Retrospective prediction of the global warming slowdown in the past decade. Nature Climate Change, 3, 649-653
5. Doblas-Reyes, F.J., Hagedorn, R., Palmer, T.N., 2006. Developments in dynamical seasonal forecasting relevant to agriculture management. Climate Research, 33:19–26

*List of up to 5 relevant previous projects or activities, connected to the subject of MED-GOLD;*

- 2016. Joint Research Center (JRC). *Seasonal forecast predictions to be used within the MARS Crop Yield Forecasting System.*
- 2015-2018. European Commission (H2020) *PRIMAVERA: PRocess-based climate sIMulation: AdvAnces in high resolution modelling and European climate Risk Assessmt*
- 2015-2018. European Commission (H2020). *IMPRESX: IMProving PREdictions and management of hydrological Extremes*
- 2012-2016. European Commission (FP7). *SPECS: Seasonal-to-decadal climate Predictions for the development of European Climate Services*
- 2012-2016. European Commission (FP7). *EUPORIAS: European Provision Of Regional Impacts Assessments on Seasonal and Decadal Timescales*

*Description of any significant infrastructure and/or any major items of technical equipment, relevant to MED-GOLD proposed work;*

The BSC hosts MareNostrum III, a Tier-0 PRACE system with 1.1 Pflap/s capacity as well as other High-Performance Computing (HPC) resources, which will be used by ESRs during their training in climate modelling to conduct their experiments. The BSC also coordinates the Spanish Supercomputing Network, which is the main instrument to grant competitive computing time to Spanish research institutions. The BSC is located within a university campus, and has special agreements to use the university residence and other university facilities (libraries, EDUROAM network, etc.).



#### 4.1.5 CNR, Institute of Biometeorology ([www.ibimet.cnr.it](http://www.ibimet.cnr.it)), Italy



## National Research Council of Italy

### *Description of the legal entity and its main tasks, with an explanation of how its profile matches the tasks in MED-GOLD*

The National Research Council (Cnr) is the largest public research institution in Italy, the only one under the Research Ministry performing multidisciplinary activities.

Founded as legal person on 18 November 1923, Cnr's mission is to perform research in its own Institutes, to promote innovation and competitiveness of the national industrial system, to promote the internationalization of the national research system, to provide technologies and solutions to emerging public and private needs, to advice Government and other public bodies, and to contribute to the qualification of human resources.

In the Cnr's research world, the main resource is the available knowledge, which means people, with their skills, commitment and ideas. This capital comprises more than 8.000 employees, of whom more than half are researchers and technologists. Some 4.000 young researchers are engaged in postgraduate studies and research training at Cnr within the organization's top-priority areas of interest. A significant contribution also comes from research associates: researchers, from Universities or private firms, who take part in Cnr's research activities.

The institutional CNR-IBIMET, which is part of the National Research Council of Italy, aims at the scientific research and training in the field of meteorology, climatology and their applications. In particular CNR-IBIMET is focused on the study of environmental parameters effect on the main chemical and physical phenomena in the atmosphere, biosphere and geosphere. Its basic activity is to carry out interdisciplinary research projects in recently developed scientific areas, such as meteorology, agro-meteorology, remote sensing and environmental analysis, assuming that the monitoring and management of natural and agricultural resources requires an exhaustive knowledge of environmental phenomena, which can be gained only by interdisciplinary groups. Among the activities of CNR-IBIMET a particular attention has always been devoted to the study of the nature, causes and effect of climatic change. In particular, modelling studies of the impact of climatic change on environment and agricultural and natural ecosystems have been considered as major fields of research and are part of national and international activities in which CNR-IBIMET is involved.

CNR-IBIMET developed strong expertise and competencies in crops production forecasting and assessment, quality evaluation and food safety risk assessment and management, risk assessment and management for adaptation to climate change at local, regional and global scale.

### *Role description*

CNR will mainly support the development of the pilot services on durum wheat/pasta taking advantage of the already existing links with the industrial partner Barilla. Moreover they contribute to the assessment of the overall quality of climate data. CNR will also contribute to the organization of the summer training events and the presentation and updates of the Data management plan

### *Curriculum vitae or description of the profile of the persons, including their gender, who will be primarily responsible for carrying out the proposed research and/or innovation activities.*

**Massimiliano Pasqui (M)** PhD, is a physicist and researcher of CNR-IBIMET, he has been leading research activities on climate change modelling and impacts adaptation in agriculture, seasonal forecasts in the Mediterranean Basin and West Africa and climate services for water management. He is leading research activities in national and international

**Piero Toscano (M)**, Dr. is a researcher, he has been coordinator of research projects at the national level in collaboration with leading companies in the sector of food production, led WP of national projects for air quality monitoring, leading WP of international project for mycotoxin mixtures risk assessment modelling (EFSA MYCHIF) and has participated in different International Projects (JECAM, EFSA MODMAP-AFLA, ESA-CEFLES FLEX, CARBOEUROPE, CARBOAFRICA, GHG-EUROPE, BRIDGE,

EUROCHAR). He's the author in more than 30 papers in international refereed ISI journal, Scholar H-index 11. He has developed and applied new numerical models for agricultural applications and agrometeorology to identify the yields and quality of cereals, and through implementation of innovative technology in the area of prevention, implemented tools for the analysis and management of contaminants at various stages in the supply chain to enhance the quality and safety of food.

*List of up to 5 relevant publications, and/or products, services (including widely-used datasets or software), or other achievements relevant to MED-GOLD;*

1. Toscano, P., Genesio, L., Crisci, A., Vaccari, F.P., Ferrari, E., Cava, P.L., Porter, J.R., Gioli, B. Empirical modelling of regional and national durum wheat quality. 2015 Agricultural and Forest Meteorology, 204, pp. 67-78. DOI: 10.1016/j.agrformet.2015.02.003
2. Toscano, P., Gioli, B., Genesio, L., Vaccari, F.P., Miglietta, F., Zaldei, A., Crisci, A., Ferrari, E., Bertuzzi, F., La Cava, P., Ronchi, C., Silvestri, M., Peressotti, A., Porter, J.R. Durum wheat quality prediction in Mediterranean environments: From local to regional scale. 2014 European Journal of Agronomy, 61, pp. 1-9. DOI: 10.1016/j.eja.2014.08.003
3. Toscano, P., Ranieri, R., Matese, A., Vaccari, F.P., Gioli, B., Zaldei, A., Silvestri, M., Ronchi, C., La Cava, P., Porter, J.R., Miglietta, F. Durum wheat modeling: The Delphi system, 11 years of observations in Italy. 2012 European Journal of Agronomy, 43, pp. 108-118. DOI: 10.1016/j.eja.2012.06.003
4. Battilani, P., Toscano, P., Van der Fels-Klerx, H.J., Moretti, A., Camardo Leggieri, M., Brera, C., Rortais, A., Goumperis, T., Robinson, T., Aflatoxin B1 contamination in maize in Europe increases due to climate change. Scientific Report, 6 2016, p. 24328

*List of up to 5 relevant previous projects or activities, connected to the subject of MED-GOLD;*

- EFSA-MYCHIF Mycotoxin mixtures in food and feed: holistic, innovative, flexible risk assessment modelling approach European Food Safety Authority
- EFSA MODMAP-AFLA Modelling, predicting and mapping the emergence of aflatoxins in cereals in the EU due to climate change European Food Safety Authority
- JECAM Joint Experiment for Crop Assessment and Monitoring, GEO Global Agricultural Monitoring (GEOSS Task AG0703 a) and Agricultural Risk Management (GEOSS Task AG0703)
- MACSUR (JPI – FACCE) “Impacts of climate change on European agriculture“ <http://www.faccejpi.com/FACCE-MACSUR>
- IC-FAR “Linking Long Term Observatories with Crop Systems Modeling For a better understanding of Climate Change Impact, and Adaptation Strategies for Italian Cropping Systems” <http://www.icfar.it>

*Description of any significant infrastructure and/or any major items of technical equipment, relevant to MED-GOLD proposed work;*

N/A



#### 4.1.6 DCoop (<https://www.dcoop.es>), Spain



##### *Description of the legal entity and its main tasks, with an explanation of how its profile matches the tasks in MED-GOLD*

The food group DCOOP S.C.A is a large second-degree cooperative of more than 75.000 farmers, it exports its products to a hundred countries. Currently, the group has seven sections: Olive oil, Table olives, Wine, Livestock, Services and supplies and Credits. Dcoop is the world's largest producer of olive oil, with average production of 220,000 tonnes of olive oil per campaign. The farmers grow about 50 million olive trees on 400,000 hectares of olive groves in the south of Spain. This 400,000 hectares of groves are in different pedoclimatic areas, where are grown organic and conventional olives.

DCOOP is the world's largest producer of olive oil, therefore it is the olive oil industrial partner on this project. The Climate Change might transform the agriculture, consequently Dcoop will study managing shift in olives yield and their production.

THE GROUP will apply climate information for take better management decisions, making strategic decisions, estimating yields and improve production. Also, DCOOP will select and offer the critical areas and the areas would become unsuitable in the future. DCOOP will provide data of field, production and olive trees illness.

Moreover, DCOOP will help to do a cost-benefit analysis and dissemination of successful cases within olive sector.

##### *Role description*

DCOOP take part to collect the previous information and final results. In this sense, the cooperative provide yield, pest and production information. DCOOP co-design pilot service on olive industry and assess the added value of climate services into decision making. Too, DCOOP collaborates into other work packages .

DCOOP will collect its production data and it assess the model data, matching the production and model data. Other task will be testing the developed model and validation its information. DCOOP select and offer location for yield and pest trials.

DCOOP participates in work package 2 where will collaborate to the design of climate services in olive sector. Here, Dcoop will detect the needs of the sector, help the implementation of the tools and provide data from the sector in recent years. Dcoop will test pilot service and report effects. Also, DCOOP will show the changes in production when it use the pilot services and test output of agro-ecosystem models. On the other hand, DCOOP will assess a cost-benefit analysis of pilot service in olive sector.

##### *Curriculum vitae or description of the profile of the persons, including their gender, who will be primarily responsible for carrying out the proposed research and/or innovation activities.*

**Silvia López-Feria, (F).** PhD in analytical chemistry, with 12 years of experience in olives and olive oil, 8 of them as Head of R&D in Dcoop Group. She studied biology and started its activity in the olive sector thanks to a university project. She continued her research training in this area in a food research center specializing in the olive grove and culminated this stage by a European thesis dedicated to olive oil, determination of its quality and detection of pollutants. A stay at the University of Tübingen (Germany) allowed her to implement other methods to the analysis of the olive oil volatile fraction. Finally, after obtaining the degree of doctor continued his career in the word of olive as head of the R&D Department of Dcoop Group, where she takes 8 years managing projects related to the subject of this proposal.

**Juan Carlos Vega, (M).** He studied agricultural engineering on Cordoba University. Since 2000, he started his career providing services to cooperatives in Federation of Cooperatives in Seville as head of OLEO UNIÓN, the biggest organizations of producers recognized of Andalusia. In 2006, he started to work on Dcoop for the coordination of aid from Community Agricultural Policy. Then, in 2009, he continued his career as head of Supplies and Services Section of Dcoop, coordinating all activities of cooperatives advisory, management aid field, integrate production, etc. for improve the production and quality in farmland and mills oils.

**Javier López, (M).** Graduate in Environmental Science with a Master degree in Distributed Renewable

Energies by University of Cordoba. He owns knowledges about Climate Change, Terrestrial Ecosystems and natural Resources, plant Biology and Integrated Water Management acquired during the university studies. He contributed in the Department of Chemical Engineering providing aid in the R&D like student of University of Córdoba. Then, he has continued his professional career as Technical quality control technician of seeds of Iberian vegetation. Currently, he works like as technical on R&D department. Finally, he collaborated with a national research agency on project of soil erosion for 2 months.

**Rafael Romero Onorato, (M).** He is Agricultural Technical Engineer who is responsible for the technical team of field for more than 10 years. He coordinates all actions of control, management and monitoring of farmers and growers members of the Dcoop group. Currently, technical team is studying of agronomic practices to reduce impact of climate.

*List of up to 5 relevant publications, and/or products, services (including widely-used datasets or software), or other achievements relevant to MED-GOLD;*

1. Usefulness of the direct coupling headspace-mass spectrometry for sensory quality characterization of virgin olive oil samples (2007) S. López-Feria, S. Cárdenas, J.A. García-Mesa, M. Valcárcel.
2. Quantification of the intensity of virgin olive oil sensory attributes by direct coupling headspace-mass spectrometry and multivariate calibration techniques (2007) S. López-Feria, S. Cárdenas, J.A. García-Mesa, A. Fernández-Hernández, M. Valcárcel. Journal of Chromatography 1147(2):144-52.
3. Simplifying chromatographic analysis of the volatile fraction of foods (2008) S. López-Feria, S. Cárdenas, M. Valcárcel. TrAC Trends in Analytical Chemistry 27 (2008) 794-803.
4. Simple and rapid instrumental characterization of sensory attributes of virgin olive oil based on the direct coupling headspace-mass spectrometry (2008) S. López-Feria, S. Cárdenas, J.A. García-Mesa, M. Valcárcel. Journal of Chromatography 1188(2):308-13.
5. Classification of extra virgin olive oils according to the protected designation of origin, olive variety and geographical origin (2008) S. López-Feria, S. Cárdenas, J.A. García-Mesa, M. Valcárcel. Talanta 75(4):937-43.

*List of up to 5 relevant previous projects or activities, connected to the subject of MED-GOLD;*

- *IoF2020: Internet of Food and Farm.(H2020-IOT-2016).*
- *NUEVAZZAIT: Detection and quantification of the factors influencing new oil quality parameters and development of new management processes (national project).*
- *PRODUCT ENVIRONMENTAL FOOTPRINT- PEF PILOT IN OLIVE OIL” (Stakeholder in collaboration with Spanish Olive Oil Interprofessional for this European project).*
- *AGRICULTURAL PRACTICES FOR ADAPTATION TO CLIMATE CHANGE IN OLIVAR (internal project).*
- *GANADOLIVO: New uses of olive by-products for animal feed (regional project).*

*Description of any significant infrastructure and/or any major items of technical equipment, relevant to MED-GOLD proposed work;*

Dcoop has a Farming and Technical Department composed by professionals who inform, advise and train those cooperatives that so request it. The main objectives of this department are: integrated pest management, farm advisory, information and disclosure and data interpretation of soil and water analysis

The ATRIAs (Associations for Integrated Treatment in Agriculture) are responsible for providing continued technical assistance to farmers on protection against pests and agents harmful to olives throughout the growing cycle.

They operate as follows: each region is divided into homogeneous areas, allocated to an ATRIA. In turn, each area is divided into “sampling plots”, so that the state of olives in this portion is similar to the whole represented area. Each ATRIA has a technician who weekly visits all plots on-site to check the evolution of all pathogens that may affect the olive grove. The purpose of this monitoring carried out in the field is to provide technical advice to farmers if necessary.

This information is sent to the cooperatives on a weekly report, to be distributed to farmers in the best possible way.

That means that the DCOOP Group works hard to produce the best oil respecting the environment and reducing costs.

For this, integrated production techniques are being implemented in order to adapt the means we use to our purposes, in other words, to achieve a sustainable olive-growing with the best harvest, preventing soil

erosion and applying the phytosanitary measures that are needed.

In addition, environmentally friendly farms are engaged in olive growing (Sierra Morena, La Mancha, Campiñas Andaluzas, Valle del Guadalhorce ...), which enables us to offer a high quality oil produced from organic crops

#### 4.1.7 EC2CE (<http://www.ec2ce.com/>), Spain



##### *Description of the legal entity and its main tasks, with an explanation of how its profile matches the tasks in MED-GOLD*

ec2ce is a technological company that creates decision tools for Ag sector, based on complex AI predictive models that are embedded in the product, providing simulation, decision and automation systems. ec2ce technology is built on three main pillars:

- Automatic modeling and exploitation processes, to reduce costs and development time
- Scalable methodology, to extend the use of models to areas with few or no historical data
- Advanced combination of algorithms, to guarantee a high accuracy.

The company was created on January 2014 promoted by founding partners who were working as executive vice-presidents in a multinational in the agro-energy business. Motivation was a life change and having the opportunity to create and develop a technological company oriented to minimize food lost and waste in the Ag supply chain.

The initial stage was strategic definition and financing the company with private equity from partners and R&D public financing in order to incorporate technical capabilities for generating predictive models and accessibility to market.

The company deployed a demonstration project during 2015 with weekly predictions of US corn yield, publishing results from April to October in its website and emailing to main global grain players.

After validating the technology, we started commercial operations in 2016, reaching 120k revenues in 6 months by contracting validation projects with customers, in which we have been implementing predictive models in real harvest.

##### *Role description*

Application of artificial intelligence models to olive oil production and pest affections based on weather and climate conditions and focussing on main world production areas.

##### *Curriculum vitae or description of the profile of the persons, including their gender, who will be primarily responsible for carrying out the proposed research and/or innovation activities.*

**Ricardo Arjona (M)** Founder, CTO & COO in a technological start up. More than twelve years as executive in a multinational company in the energy and fuel sectors, keeping a very well balanced equilibrium between management and technical skills. Specialized in create and develop new business and introducing new technological products in the market. Industrial Engineer, Chemical Specialty 1992. MBA (EOI) 1996. PhD in Industrial and Chemical Engineering 2002. Several Post Grade courses (Insead, Seville University, Nrel, ...). More than 50 patents tied to Biotechnology, process and catalyst developments. Several papers in international publications. Prize Artigas Sanz to the best Thesis in Chemical Engineering in Spain in 2002.

**Gualberto Asencio Cortés (M)**, Artificial intelligence technology manager in EASYTOSEE AGTECH S.L. Assistant professor in Pablo de Olavide University (Sevilla). PhD in Data Mining, Computer Science Engineer and Machine Learning expert.

**Miguel Ángel Molina Cabanillas (M)** Assistant Research Engineer at Department of Systems Engineering and Automation for 5 years.

##### *List of up to 5 relevant publications, and/or products, services (including widely-used datasets or software), or other achievements relevant to MED-GOLD;*

- Olive oil production models for jaén, 2016 and currently
- Models for olive fly pest, 2016 and currently
- Models for horticulture productivity based on climate conditions, 2016/2017

<ul style="list-style-type: none"> <li>Models for corn yield in USA based on El Niño and La Niña</li> <li>Conferencia: “Inteligencia Artificial aplicada en Smart-Agro”; Modelos predictivos aplicados a la agricultura: cosecha anual, evolución de plagas, casos de éxito: puesta en producción en olivar e invernaderos</li> </ul>
<i>List of up to 5 relevant previous projects or activities, connected to the subject of MED-GOLD;</i>
<ul style="list-style-type: none"> <li>Proyecto Retos Inteligencia Artificial aplicada a la Gestión de Plagas, IA2GIP; Referencia proyecto: RTC-2016-5524-2; Solicitante: AGC MARKET VIEW SERVICES</li> </ul>
<i>Description of any significant infrastructure and/or any major items of technical equipment, relevant to MED-GOLD proposed work;</i>
N/A

#### 4.1.8 GMV, ([www.gmv.com](http://www.gmv.com)), Spain



##### *Description of the legal entity and its main tasks, with an explanation of how its profile matches the tasks in MED-GOLD*

GMV Areospace and Defence S.A.U. ([www.gmv.com](http://www.gmv.com)), a privately-owned, technology multinational industrial group founded in 1984 and headquartered in Madrid (Spain), with affiliates and offices in more than 10 countries: Spain, USA, Portugal, Germany, France, Poland, India, Romania, Malaysia, Colombia and UK.

GMV is talented by more than 1200 skilled staff and provides revenues figures of 125+MEUR. It embraces several branches devoted to specific markets, which collaborates together to provide the cut-of-the-edge innovations for the citizens' benefits.

GMV has actively involved in the Copernicus (former GMES) program, within European Commission framework programs. Within Copernicus programme, GMV has participated in different thematic areas either funded by ESA or EC. Besides, GMV has been present in EU projects related with climate change issues in cities since many years ago –FP6 OSIRIS for Valladolid real-time pollution maps-.

Agriculture is an area in which GMV is providing operational services for precision farming, phyto-sanitation, irrigation control, satellite based agriculture insurance, etc. Agri-services can be provided as geo-enabled Business Intelligence (GeoBI) web based services and extended to support end-users mobility through cell phones. GMV technology covers advanced databases, supporting huge data volumes in transaction with users if needed. GMV has developed an automatic service chain, which links advanced algorithms, including essential climate variables, for farming operations. The main input for these services is the multi-resolution satellite imagery, integrated with ground parameters such as temperature and relative humidity from in-situ weather stations observations and other proximal sensors (on board of harvesters and combines) as well as field inspection data. Dynamic and visual daily reports, including thematic maps and key performance indicators such as risks, productivity, and sensibility impact are an ideal source for performing science-based decision-taken.

GMV remote sensing applications are successfully operationally working in support of agricultural operations such as crop monitoring and early warnings triggering. Successful case studies have been carried out in La Rioja (Spain) since the 2010 growing campaign, in association with top Spanish wine-grape producers, in Argentina with soybean producers and in Brazil with sugar cane producers. Name cannot be disclosed for confidentiality reasons. Aligned applications have been developed for forest management, biomass, clearings and CO<sub>2</sub>, biodiversity.

GMV owns that international network of offices ready to support the project results beyond project duration. GMV technology is deployed at customers all around the world. This extensive network allows marketing our products and services in a very professional and efficient manner.

GMV is committed to innovation, dedicating more than 10% of its profits to Research and Development activities. Moreover, GMV has a track record of 27 patents.

##### *Role description*

GMV role in the project can be summarized as follows:

- To provide added value to the climate service through EO time series on critical variables for each crop for both validating models and providing reliable monitoring trends
- To enhance the potential for market uptake of the demonstrated climate services making use of its own capability of global market reach
- To ensure the replicability of the developed climate services in the identified potential end-user markets
- To promote a better informed and connected end-user community through a comprehensive communication plan with stakeholders which supports the implementation of SDG 13.

##### *Curriculum vitae or description of the profile of the persons, including their gender, who will be primarily responsible for carrying out the proposed research and/or innovation activities.*

**Juan Suárez (M).** BSc in Geography, he has more than 18 years of experience on applied EO, geo-informatics and digital mapping. He has a large experience in the development of value added EO applications. Juan is responsible for the development of the GMV's WinEO, Weather information and Earth



Observation Agricultural Services. WinEO serves different applications such as agricultural development, food security, agricultural insurance and precision farming. Aside of agricultural services, Juan has long experience in serving other verticals, among others forestry and environment, utilities, humanitarian aid and disaster relief. Before joining GMV Juan worked as remote sensing and GIS consultant at different geospatial consultancy companies, serving both private and institutional customers. Early in his professional career Juan worked as Research Assistant at the Fire Ecology and Global Change Group of the University of Castilla – La Mancha.

**Oscar Alonso (M)** is Ph. D. in Physics. From the moment he joins GMV in 1998 he has worked on all projects that GMV has developed for the Spanish National Meteorological Agency, in particular related to the EUMETSAT SAF NWC. He was also involved in other projects related to the development of models and algorithms for data processing of scientific content, such as the design review of the Climate SAF. He masters the needed mechanism for collecting, storing, integrating, analysing and sharing EO derived products.

**David de la Fuente (M)**. MSc. in Physics from the University of Valladolid, Spain, in 2005. He has been involved in the development of ESA projects like DRUID, DRAGON-II and other projects held during his experience as researcher at LATUV laboratory (Laboratory of Remote Sensing of the University of Valladolid).

*List of up to 5 relevant publications, and/or products, services (including widely-used datasets or software), or other achievements relevant to MED-GOLD;*

1. Mensah, F., Suárez Beltrán, J. (2015): **“Supporting Agricultural Development in Ghana with Geospatial Technologies”**. GeoSpatial World Forum 2015
2. Suárez Beltrán, J., Tabasco Cabezas, A. (2014): **“Analysis, control and monitoring as pillars for Precision Agriculture”**. Geospatial World Forum 2014.
3. de la Fuente Blanco, D., Yagüe Ballester, M.J., Suárez Beltrán, J. (2013): **“Potentiality of World-View 2 data for Precision Agriculture”**. IEEE International Geoscience and Remote Sensing Symposium - IGRASS 2.013 (submitted)
4. de la Fuente Blanco, D., Yagüe Ballester, M.J., Suárez Beltrán, J. (2013): **“Saving is Earning: Precision Agriculture Revenues from Earth Observation”**. Geospatial World Forum 2013 – Monetising Geospatial Value & Practices
5. de la Fuente Blanco, D., Yagüe Ballester, M.J., Suárez Beltrán, J. (2012): **“Earth observation for crop growth monitoring in precision agriculture”**. Toulouse Space Show 2012.
6. de la Fuente Blanco, D., Yagüe Ballester, M.J., Suárez Beltrán, J. (2012): **“Smart agricultural watering merging earth observation and meteo data”**. Toulouse Space Show 2012.

*List of up to 5 relevant previous projects or activities, connected to the subject of MED-GOLD;*

- **WinEO, Weather information and Earth Observation products and services in support of Agricultural Operations (2009 – on-going)** Earth observation and meteo data based portfolio of products and services tailored for rural development, agricultural risk management, crop insurance, precision agriculture operations and food security. WinEO has been deployed for wine monitoring in La Rioja (Spain), soybean and corn production (Argentina and Brazil), cotton (Brazil) and sugarcane (Brazil).
- **MyWater (2011-2014)**: Overall MyWater will provide reliable information on water quantity, quality and usage for appropriate water management, improving knowledge and creating the forecasting capabilities necessary to catchment managers, and at the same time optimizing the ratio cost/benefit of water resources monitoring. MyWater implemented a new information platform which integrates data from three scientific research areas – earth observation, meteorology and catchment modelling – to better access hydrological processes. Earth observation satellites were used to identify Land Cover Land Use (LCLU), measure Leaf Area Index (LAI), Evapotranspiration and Soil Moisture.
- **ESA FIRE CCI Phase 1 (2010-2011)**. The ESA CCI Programme comprises the generation and provision of 13 Essential Climate Variables (ECV) on global scale based on long-term satellite data time series. “Fire Disturbance” is deemed as one of these Essential Climate Variables and is tackled through the Fire\_cci project. Burned area (BA), as derived from satellites, is considered as the primary variable for the Fire Disturbance ECV (Essential Climate Variable). It can be combined with information of combustion completeness and available fuel load to estimate emissions of trace gases and aerosols.
- **ESA Data User Element GLOBAEROSOL (2006-2009)**. Large series of aerosol products for climate

change analysis. Its purpose was to produce daily global aerosol maps ranging from 1995 to 2007 by analyzing the data produced by four different sensors from three distinct satellites in orbit: ATSR-2 (from ERS-2), AATSR and MERIS (from ENVISAT), and SEVIRI (from MSG-2). This will support the information needs of users in climate and meteorological research, transboundary pollution and air quality agencies. The GlobAEROSOL dataset spans the full operational lifetime of the instruments in question, up until the end of 2007, and thus provides an almost unbroken global coverage.

- **GMES Service Element Program PROMOTE (2006-2009).** Atmospheric variables effect on climate change and on health. GMV provided the Dust Awareness service producing hourly maps of dust concentrations -including Angstrom coefficient and winds direction- both as measured and as predicted in the demonstration period 2006-2008 over Spain and Portugal. Spanish National Institute of Meteorology (INM) in-situ sensors data for air parameters monitoring placed in the Azaña Observatory at the Canary Islands were integrated.

*Description of any significant infrastructure and/or any major items of technical equipment, relevant to MED-GOLD proposed work;*

GMV has its engineering and R&D centre for Space market in the Technological Park of Tres Cantos (Madrid, Spain), where it counts with a space of 15,000 sqm of office room. On these facilities GMV enjoys a modern suite of computers and peripherals, interconnected via a Giga Ethernet local area network controlled by TCP/IP. This infrastructure not only provides vital support to the tasks of systems engineering and software development, but also an efficient electronic communication with EC, partners and research and development centres worldwide.

GMV meeting rooms can be prepared either as lecture rooms or laboratories for practical sessions. GMV Headquarters facilities in Madrid consists of a flexible area of around 225m<sup>2</sup> whose layout can be easily configured to held parallel meetings or separate discussions according to courses/meetings structure. A single open space configuration allows for 80-100 people meeting. All GMV offices around the world are available to host project meetings.



#### 4.1.9 HORTA, ([www.horta-srl.it](http://www.horta-srl.it)), Italy



##### *Description of the legal entity and its main tasks, with an explanation of how its profile matches the tasks in MED-GOLD*

Horta Srl is a university spin-off company borne in 2008, its mission is to increase the value of research by transferring the technological innovation to practical agriculture at national and international level, by developing new cropping strategies, methods and products. The core activity of Horta is the development of Decision Support Systems (DSSs) for sustainable crop production based on new Information and Communication Technologies (ICTs). Horta has all facilities and expertise to design, develop, test, and deliver to final users new ICT solutions. Horta has developed and delivered to the Italian market DSSs for durum wheat (granoduro.net®), grapevine (vite.net®), barley (orzobirra.net®) which are currently used in 30000 ha of durum wheat and 6000 ha of vineyards, respectively, across Italy. DSSs for tomato, melon, soybean, sunflower and olives are currently in the developmental stage.

During the last years, the use of the granoduro.net® reduced cultivation costs by up to 10%, carbon footprint by up to 16%, use of nitrogen fertilizer by up to 20%, and increase NUE by up to 25 %, compared to usual cultivation. No differences were found in disease development and mycotoxin contamination of grain at harvest, as well as in grain yield and quality. Therefore, the DSSs developed by Horta are useful tools to be used to achieve a more sustainable crop management, including a more sustainable use of pesticides as requested by the Directive 128/2009/CE.

As Barilla's third party, system granoduro.net®. In WP4, Horta will implement the models for seasonal weather forecasts in granoduro.net®. Horta will operate the decision support system, testing the DSS functioning with seasonal weather forecasts as input and eventually improving it. In WP5, Horta will take part to workshops organized for the durum wheat sector, presenting granoduro.net® to the Med-GOLD community. In WP6 Horta will support Barilla in its activities of dissemination of project results.

##### *Role description*

Horta will participate in WP4, WP5 and WP6, for activities concerning the decision support system granoduro.net®. In WP4, Horta will implement the models for seasonal weather forecasts in granoduro.net®. Horta will operate the decision support system, testing the DSS functioning with seasonal weather forecasts as input and eventually improving it. In WP5, Horta will take part to workshops organized for the durum wheat sector, presenting granoduro.net® to the Med-GOLD community. In WP6 Horta will support Barilla in its activities of dissemination of project results.

##### *Curriculum vitae or description of the profile of the persons, including their gender, who will be primarily responsible for carrying out the proposed research and/or innovation activities.*

**Pierluigi Meriggi**, (M), MSc in Agricultural Sciences. His expertise lies in integrated crop production and grower's advising. He was the head of the R&D department of Eridania, Begin Say from 1983 to 2008. He was a contracting professor at the University of Piacenza in Weed Management from 2004 to 2010.

**Matteo Ruggeri**, (M), PhD in plant pathology, agronomist. His expertise lies in carrying out experimental fields for demonstration activities and identification of the environmental impacts of the innovative management strategies or tools proposed.

**Benini Cristian**, (M), technician. His expertise lies in carrying out experimental field trials at the Horta Stations.

**Giovanni Miccoli**, (M), technician. His expertise lies in carrying out experimental field trials at the Horta Stations.

**Tiziano Bettati**, (M), MSc in Agricultural Sciences. Coordinator of the ICTs Horta's office. Twenty-year project management experience in design and development of farm and territorial information systems in agrofood area.

**Cristian Veronesi**, (M), software developer, and Systems Administrator, Technical Industrial School oriented to Computer Science. Software design and development of Web-based applications in agro-food

area.

**Marco Ilic**, (M), software developer, MSc in Electronic Engineering. Design and development of farm and territorial information systems with PC and intra/internet technology.

**Alessandro Mennillo**, (M), software developer, BSc in Computer Science.

**Valentina Manstretta**, (F), PhD in plant pathology, employed in the research and development department.

*List of up to 5 relevant publications, and/or products, services (including widely-used datasets or software), or other achievements relevant to MED-GOLD;*

Rossi V., Manstretta V., Ruggeri M. (2015). A multicomponent decision support system to manage Fusarium head blight and mycotoxins in durum wheat. *World Mycotoxin Journal*, 8 (5), 629-640. Doi: 10.3920/WMJ2015.1881

Blasi, E., Monotti, C., Ruini, L., Landi, C., Avolio, G., & Meriggi, P. (2014). Eco-innovation as a driver in the agri-food value chain: an empirical study on durum wheat in Italy. *Journal on Chain and Network Science*, 15(1), 1-15.

Rossi, V., Caffi, T., & Salinari, F. (2012). Helping farmers face the increasing complexity of decision-making for crop protection. *Phytopathologia Mediterranea*, 457-479.

Rossi, V., Giosuè, S., & Caffi, T. (2010). Modelling Plant Diseases Modelling Plant Diseases for Decision Making in Crop Protection. In *Precision crop protection-the challenge and use of heterogeneity* (pp. 241-258). Springer Netherlands.

Rossi, V., Meriggi, P., Giosue, S., Caffi, T., & Bettati, T. (2010). A web-based decision support system for managing durum wheat crops. INTECH Open Access Publisher.

*List of up to 5 relevant previous projects or activities, connected to the subject of MED-GOLD;*

- H2020-SFS-2015-2- 2016-2020 “Safe food and feed through an integrated ToolBox for Mycotoxin Management” (MyToolBox – The smart way to tackle mycotoxins).
- LIFE15 ENV/IT/000641 “Innovative approach to soil management in viticultural landscapes” (SOIL4WINE).
- FP7-KBBE-2010-4 “Pesticide Use-and-risk Reduction in European farming systems with Integrated Pest Management” (PURE).
- IDeMCroP “Development of a fine-scale, ICT-based, integrated system for informed decision making in sustainable crop protection”.
- FP7-KBBE 2012.3.5-03 “Integrating bio-treated wastewater with enhanced water use efficiency to support the Green Economy in EU and India” (WATER4CROPS).

*Description of any significant infrastructure and/or any major items of technical equipment, relevant to MED-GOLD proposed work;*

Horta has an operational seat in an experimental farm (Horta Station) in Ravenna where all the facilities necessary to carry out field trials with replicate plots are available, including sowing, irrigation, application of fertilisers and plant protection products, and harvesting. Facilities to determine main characters of the harvested products (standard weight, humidity, protein, etc.), as well as instrument such as porometer, N tester, crop scan and NDVI measurer, are also available. Horta has another experimental farm in Foggia (south Italy – Puglia Region) on small grain with the same facilities of Ravenna.

Concerning ICT solutions, HORTA uses a technological infrastructure composed of: i) high speed internet connection 10/10 Mb; ii) firewall and security architecture, iii) enterprise level DBMS (Oracle, PostgreSQL) and iv) enterprise application servers (Oracle application server, jBoss). The infrastructure is formed by four physical servers equipped with SUSE Linux enterprise server. One of the server is also equipped with VMware VSphere essentials and VEEAM backup essentials for server and application virtualization. Data are daily back-upped.

Currently HORTA manages over 500 users, with 188.000 session/year and a weather database of 3 million records provided by over 450 weather station from over 10 different data providers.

#### 4.1.10 JRC (<https://ec.europa.eu/jrc/en>), Italy



##### *Description of the legal entity and its main tasks, with an explanation of how its profile matches the tasks in MED-GOLD*

The Joint Research Centre (JRC) of the European Commission is the in-house science service of the Commission, its mission is to provide EU policies with independent, evidence-based scientific and technical support throughout the whole policy cycle. Its work has a direct impact on the lives of citizens by contributing with its research outcomes to a healthy and safe environment, secure energy supplies, sustainable mobility and consumer health and safety. The Food Security Unit of the Directorate for Sustainable resources develops methods, tools and systems for use within agricultural monitoring activities applied to Europe and other areas of the world. The Unit supports the implementation of the Common Agricultural Policy and its instruments, such as the Good Agricultural and Environmental Conditions (GAEC) standards and the Farm Advisory System (FAS). It also contributes to the Digital Agenda for Europe and the 'Integrated Industrial Policy for the Globalisation Era' with regard to environmental observations sharing and standard setting. The Unit supports the EU Food Security Thematic Programme and food assistance policies by providing assessments and early warnings of agricultural production in food-insecure regions of the world. In addition, the Unit works on the assessment of climate change impacts on agriculture in support to the EU climate change policy agenda and the Europe 2020 flagship initiative for a resource-efficient Europe.

The Unit provides near real-time crop growth monitoring and yield forecasting information for the EU and its neighbourhood. It also assesses climate change impacts on agriculture through the simulation of impacts of climate change scenarios in crop models. Moreover, it provides scientific advice and early warning on agricultural production in food-insecure regions of the world. All the information it gathers helps to prepare food balance sheets that are used for market analyses and decisions related to the CAP management of stocks, imports and exports, market interventions and budget preparation.

##### *Role description*

JRC leads the WP4 on the Co-design of pilot service for durum wheat and contributes to WP1, WP5, WP6 and WP7. Its main role is on the integration of climate services into the agricultural assessments of climate change, climate variability and extremes impacts on durum wheat.

##### *Curriculum vitae or description of the profile of the persons, including their gender, who will be primarily responsible for carrying out the proposed research and/or innovation activities.*

**Andrea Toreti (M).** Senior Scientist (Ph.D. in Climate Sciences). His main research focuses on: climate extremes and impacts on agriculture; climate variability, climate change and impacts on agriculture; extreme value theory; statistical climatology; change point detection and attribution; agro-meteorology. He has carried out several studies advancing current understanding on: climate extremes and associated impacts, climate variability and crop yield, evaluation of climate models. He is leading the JRC project on climate extremes and impacts on agriculture and global agricultural markets and he is responsible for the meteo-climate infrastructure of the JRC-MARS crop monitoring and forecasting system.

**Frank Dentener (M).** Senior Scientist (Ph.D. in Physics and Astrophysics). His main research interests focus on climate, climate change and the links with atmospheric pollution and agriculture. He is an expert in large-scale modelling of atmospheric pollution, global nitrogen cycle, ozone changes and co-benefit analysis of climate mitigation options. He is lead author of the IPCC reports and co-chair of the UNECE's task force on Hemispheric Transport Air Pollution. He is leading the JRC project on climate change impacts on agriculture. He is a Thomson-Reuters highly cited scientist.

**Matteo Zampieri (M)** holds a PhD in Physics obtained from the University of Ferrara in 2006. Before joining JRC in 2016, he was a scientific researcher at: the CNR, CMCC, and the University of Bologna (Italy); the LMD (France); the University of Łódź (Poland); the HCMR (Greece); and KAUST (the Kingdom

of Saudi Arabia). His expertise is on atmospheric turbulence and interactions with the surface, atmospheric and land surface modeling, global and regional climate modeling, climate change and variability, and climatic extremes, impacts of climate change, variability and extremes on crop production.

**Andrej Ceglar (M)** holds a PhD in agro-meteorology from the University of Ljubljana. His main research interests focus on climate variability and impacts on agriculture, climate change and impacts on agriculture, crop modeling, agro-meteorology, climate services and paleoclimatology.

*List of up to 5 relevant publications, and/or products, services (including widely-used datasets or software), or other achievements relevant to MED-GOLD;*

1. Ceglar A, Toreti A, Lecerf R, Van der Velde M, Dentener F. 2016 Impact of meteorological drivers on regional inter-annual crop yield variability in France. *Agricultural and Forest Meteorology*, 216, 58-67
2. Toreti A, Giannakaki P, Martius O. 2016. Precipitation extremes in the Mediterranean region and associated upper-level synoptic- scale flow structures. *Climate Dynamics*, 47, 1925–1941.
3. Zampieri M, Toreti A, Schindler A, Scoccimarro E, Gualdi S. 2016. Atlantic multi-decadal oscillation influence on weather regimes over Europe and the Mediterranean in spring and summer. *Global and Planetary Change*, doi: 10.1016/j.gloplacha.2016.08.014.
4. Fontana G, Toreti A, Ceglar A, De Sanctis G. 2015. Early heat waves over Italy and their impacts on durum wheat yields. *Natural Hazards and Earth System Sciences*, 15, 1631-1637.
5. Toreti A, Naveau P. 2015. On the evaluation of climate model simulated precipitation extremes. *Environmental Research Letters* 10, 014012.

*List of up to 5 relevant previous projects or activities, connected to the subject of MED-GOLD;*

- Agri4Climate ‘Climate change impacts, adaptation and greenhouse gas emissions in the agricultural sector’ (JRC project, ongoing). Short description: Assess climate change impacts on agricultural yields and production as well as evaluation of adaptation-mitigation measures.
- C2ESAM ‘Concurrent climate extremes and shocks on global agricultural markets’ (JRC project, ongoing). Short Description: Analysis of the effects of climate extremes on global agricultural markets in terms of consumption, production, trade patterns and resilience.
- EU FP7-ACQWA Assessing Climate Impacts on the Quantity and Quality of Water. Short Description: Assess the impacts of climate change on the quantity and quality of water originating in mountain regions.
- LIFE08 ENV/IT/000436 ACT Adapting to Climate Change in Time. Short Description: develop processes for an effective local strategy on local climate change adaptation measures.
- EU FP6-CIRCE Climate Change and Impact Research: The Mediterranean Environment. Short Description: Evaluate climate changes in the Mediterranean region and assess associated impacts on societies and economies.

*Description of any significant infrastructure and/or any major items of technical equipment, relevant to MED-GOLD proposed work;*

N/A

#### 4.1.11 MetOffice ([www.metoffice.gov.uk](http://www.metoffice.gov.uk)), UK



##### *Description of the legal entity and its main tasks, with an explanation of how its profile matches the tasks in MED-GOLD*

The Met Office is the UK's national weather service. It provides weather and climate- related services to the Armed Forces, government departments, the public, civil aviation, shipping, industry, agriculture and commerce. The Met Office is a Trading Fund within the UK Government's Department for Business, Energy and Industrial Strategy. This status engenders a business approach in addition to our R&D activities resulting in successful products and service delivery.

The Met Office has developed and delivered climate services within the UK and internationally for many years. The users of these services are from a wide variety of sectors including agriculture, water, energy, health, transport and tourism. These services inform decision-making for adaptation and mitigation to climate variability and climate change. The development of the Met Office's climate services is a key strategic aim to satisfy customer requirements. Over the last few years the MOHC has been at the forefront of research into climate variability and predictability, development of operational ensemble prediction systems, derived applications and products for seasonal to decadal timescales.

##### *Role description*

The Met Office will lead Work Package 1 on appraising current needs, technical capabilities, and quality of climate information. An analysis of each sector will be produced at the European level, combining different kinds of data. An overall assessment of the quality of climate projections of the climate variables and indicators of interest for the three sectors will be presented. The technical capabilities required to respond to the MED-GOLD requests will be mapped here and the ICT to collect and manage all the data and the Med-GOLD information will be set here.

##### *Curriculum vitae or description of the profile of the persons, including their gender, who will be primarily responsible for carrying out the proposed research and/or innovation activities.*

**Dr Michael Sanderson (M)** holds a PhD in chemistry from the University of York. He is an expert on modelling of the impacts of climate change. He is leading the Met Office's contribution to the Copernicus Climate Change Service (C3S) project AGRI-CLASS, providing scientific advice on observations and climate data. He is also leading the Met Office's contribution to the National Institute for Health Research Health Protection Research Unit on Climate Resilience, where he is leading work on the impacts of climate change on heat waves and health. He led the science for chapters of an evidence report on possible future extreme high and low temperatures in the UK which were used for forthcoming second Climate Change Risk Assessment. He also led work identifying climate analogues for the UK, to be used to assist with improving the resilience of the UK rail network to future climatic events.

##### *List of up to 5 relevant publications, and/or products, services (including widely-used datasets or software), or other achievements relevant to MED-GOLD;*

- M.G. Sanderson, G.P. Ford (2017). Projections of severe heat waves in the United Kingdom, *Climate Research*, 71, 63-73, doi:10.3354/cr01428.
- M.G. Sanderson, H.M. Hanlon, E.J. Palin, A.D. Quinn, R.T. Clark. (2016). Analogues for the Railway Network of Great Britain, *Meteorological Applications*, 73, 731-741
- S. Wade, M. Sanderson, N. Golding, J. Lowe, R. Betts, N. Reynard, A. Kay, L. Stewart, C. Prudhomme, L. Shaffrey, B. Lloyd-Hughes and B. Harvey (2015). Developing H++ climate change scenarios for heat waves, droughts, floods, windstorms and cold snaps. Project D report prepared for the Committee on Climate Change.
- R.A. Betts, N.W. Arnell, P.M. Boorman, S.E. Cornell, J.I. House, N.R. Kaye, M.P. McCarthy, D.J. McNeill, M.G. Sanderson and A.J. Wiltshire (2012). Climate change impacts and adaptation: an Earth system view, Chapter 6, in: *Understanding the Earth System: Global Change Science for Application*,



Sarah Cornell, I. Colin Prentice, Joanna House, Catherine Downy (Eds), Cambridge University Press, Cambridge, UK, pp.160-201.

- M.G. Sanderson, A.J. Wiltshire and R.A. Betts (2012). Potential impacts of climate change on water resources in the United Kingdom, *Water Resources Research*, 48, No.8, W08512, doi:10.1029/2012WR011881.

*List of up to 5 relevant previous projects or activities, connected to the subject of MED-GOLD;*

- EUPORIAS (2012-2017): European Provision Of Regional Impact Assessment on a Seasonal-to-decadal timescale. The project aimed to develop semi-operational climate services prototypes on the seasonal timescale. The overall project was led by the Met Office, with multiple contributions across work packages. The Met Office led the development of prototype seasonal climate services for the land management (“LMTool”, <http://lmtool.euporias.eu>) and transport (“SPRINT”, <http://sprint.euporias.eu>) sectors.
- SPECS (2013-2016): Seasonal-to-decadal climate Prediction for the improvement of European Climate Services. The overall project was led by the Barcelona Supercomputing Centre. The Met Office led a work package whose aim was to improve the visualisation and understanding of seasonal-to-decadal predictions. These visualisations helped to enable the development of European climate services and to enhance the wide-range dissemination and exchange of actionable climate information based on seasonal-to-decadal predictions.
- EUCLEIA (2014-2016): EUropean CLimate and weather Events: Interpretation and Attribution. This project was coordinated by the Met Office, who also led a work package on the development and application of a near real-time attribution service. EUCLEIA provided well-verified assessments of the extent to which such weather-related risks have changed due to human influences on climate, and identified those types of weather events where the science is still too uncertain to make a robust assessment of attributable risk.

*Description of any significant infrastructure and/or any major items of technical equipment, relevant to MED-GOLD proposed work;*

- Scientific Processing and Intensive Compute Environment (SPICE) for a range of non-HPC scientific data processing. This platform will be used to analyse and process observations and seasonal/decadal forecast information as needed, and prepare data for visualisation.
- The Met Office MASS data archive – IBM HPSS (High Performance Storage System) to provide hierarchical storage management of IBM disk and tape hardware and services for very large storage requirements, together with interfaces for easy data extraction.
- Fast link to Centre for Environmental Data Archival (CEDA) JASMIN platform for data retrieval and analysis – JASMIN will be our central analysis platform, there is a link with speed in excess of 20MB/s direct from the Met Office MASS archive, and it hosts multi-petabyte disk arrays and both fast processors and a high performance cluster for dedicated parallel post-processing.

4.1.12 NOA ([www.noa.gr](http://www.noa.gr)), Greece

*Description of the legal entity and its main tasks, with an explanation of how its profile matches the tasks in MED-GOLD*

The National Observatory of Athens (NOA) is the oldest research establishment in Greece, founded in 1842 by the Vienna-based national benefactor George Sinas. The activities of NOA are organized in 3 institutes staffed with high quality scientific, research and technical personnel: the Institute of Astronomy, Astrophysics, Space Applications and Remote Sensing, the Institute of Environmental Research and Sustainable Development, and the Geodynamics Institute.

NOA's research activities are focused on the terrestrial interior, the atmospheric environment and Space, from the interplanetary medium to the astronomical Universe. Basic and applied research is conducted by using observational data from hundreds of ground based stations and several modern space probes. The Centre, with its rich scientific outcomes and activities, is linked to entrepreneurship, culture, education and the popularization of science. NOA offers critical social services, such as a daily monitoring of seismicity and issuing earthquake alerts to the Greek State Authorities on a 24/7 basis, weather forecasting, forest fires monitoring, ionospheric activity recording, continuation of a 150 years long climatic dataset and operation of one of the largest European telescopes. It also provides the national gate to the European Space Agency. The research centre has also an important contribution to public outreach via its popular visitors centers at Penteli, Thission and the Geostrophysics Museum.

*Role description*

Identification and categorization of climate services, Demonstration of climate services' added value, matching the offer and demand of climate services, communication and dissemination of projects' outcomes, networking

*Curriculum vitae or description of the profile of the persons, including their gender, who will be primarily responsible for carrying out the proposed research and/or innovation activities.*

**Dr. Giannakopoulos (M)** is Research Director at the National Observatory of Athens (NOA). His research focuses on climate change modeling of extremes and impacts on various sectors such as energy demand, health, tourism and forest fires. He was a lead author of UNEP's IPCC (Intergovernmental Panel on Climate Change) 4<sup>th</sup> Assessment Report (2007) on Climate change impacts, adaptation and vulnerability. He is NOA's Principal Investigator in several major climate change related EU projects, such as ENSEMBLES (which aims to reduce uncertainty in climate change model projections), DeSurvey (which aims to assess desertification danger across Mediterranean), CIRCE (which aims to provide an assessment of climate change and impacts for the Mediterranean region), CLIMRUN (which aims at developing a protocol for the provision of adequate climate information at regional to local scale), LIFE CYPADAPT (which aims to provide the adaptation strategy to climate change adverse impacts for Cyprus) and LIFE ADAPT2CLIMA (which focuses on adaptation options for Mediterranean islands). He also has experience in the field of global chemical transport models and has participated in the World Climate Research Program for the assessment of large-scale atmospheric model performance. He is Member of the Climate Change Impacts Study Committee formed by the Bank of Greece (<http://www.bankofgreece.gr/Pages/en/klima/default.aspx>) to study the environmental, economic and social consequences of climate change in Greece. He is the author of over 60 peer-reviewed papers and over 80 publications in conference proceedings.

*List of up to 5 relevant publications, and/or products, services (including widely-used datasets or software), or other achievements relevant to MED-GOLD;*

1. Giannakopoulos, C., Psiloglou, B., Lemesios, G., Xevgenos, D., Papadaskalopoulou, C., Karali, A., Varotsos, K.V., Zachariou-Dodou, M., Moustakas, K., Ioannou, K., Petrakis, M., Loizidou, M. Climate change impacts, vulnerability and adaptive capacity of the electrical energy sector in Cyprus (2015) Regional Environmental Change, pp. 1-14. DOI: 10.1007/s10113-015-0885-z
2. Karali, A., Hatzaki, M., Giannakopoulos, C., Roussos, A., Xanthopoulos, G., Tenentes, V., "Sensitivity and evaluation of current fire risk and future projections due to climate change: The case study of Greece", (2014) Natural Hazards and Earth System Sciences, 14 (1), pp. 143-153.

<http://dx.doi.org/10.5194/nhess-14-143-2014><http://dx.doi.org/10.5194/nhess-14-143-2014><http://dx.doi.org/10.5194/nhess-14-143-2014>

3. Lelieveld, J., Hadjinicolaou, P., Kostopoulou, E., Chenoweth, J., El Maayar, M., Giannakopoulos, C., Hannides, C., Lange, M.A., Tanarhte, M., Tyrllis, E., Xoplaki, E., Climate change and impacts in the Eastern Mediterranean and the Middle East (2012) *Climatic Change*, 114 (3-4), pp. 667-687.
4. Giannakopoulos, C., Kostopoulou, E., Varotsos, K.V., Tziotziou, K., Plitharas, A., An integrated assessment of climate change impacts for Greece in the near future (2011) *Regional Environmental Change*, 11 (4), pp. 829-843
5. Giannakopoulos, C., Le Sager, P., Bindi, M., Moriondo, M., Kostopoulou, E., Goodess, C.M., Climatic changes and associated impacts in the Mediterranean resulting from a 2 °C global warming (2009) *Global and Planetary Change*, 68 (3), pp. 209-224.

*List of up to 5 relevant previous projects or activities, connected to the subject of MED-GOLD;*

- TREASURE (ECHO/SUB/2014/695561): Thermal Risk rEducation Actions and tools for SecURE cities ([website](#)). The project integrates, for the first time, the expertise of epidemiologists, climatologists, Earth Observation scientists and IT developers into intelligent heat wave risk assessments for authorities and personalised tools for citizens all in accordance to Hyogo and UNISDR international initiatives.
- ADAPT2CLIMA (LIFE14 CCA/GR/000928): Adaptation to Climate change Impacts on the Mediterranean islands' Agriculture ([website](#)). The overall aim of the LIFE ADAPT2CLIMA project is to increase knowledge on the vulnerability of EU Mediterranean agriculture to climate change and to support decision making for adaptation planning. The methodology is based on the deployment of a set of climate, hydrological and crop simulation models for the assessment of climate change impacts on agriculture. Areas of implementation: Cyprus, Crete (Greece), Sicily (Italy).
- CLIM-RUN (FP7 - 265192): Climate Local Information in the Mediterranean region Responding to User Needs ([website](#)). CLIM-RUN Project aimed at developing a protocol for applying new methodologies and improved modelling and downscaling tools for the provision of adequate climate information at regional to local scale that is relevant to and usable by different sectors of society (policymakers, industry, cities, etc.).
- CYPADAPT (LIFE10ENV/CY/000723) ([website](#)). CYPADAPT's main aim was to strengthen and increase Cyprus adaptive capacity to climate change impacts through the development of a National Adaptation Strategy. In order to elaborate the National Adaptation Strategy a multi criteria analysis tool was developed.

*Description of any significant infrastructure and/or any major items of technical equipment, relevant to MED-GOLD proposed work;*

- Two fully equipped A class meteorological stations, at Thessio in the centre of Athens (operated since 1858, the oldest in Greece) and at Penteli, in the suburbs of Athens (operated since 1996)
- A network of 130 automatic stations all over Greece
- Two web pages providing all information on observations and operational weather forecasts ([www.noa.gr/forecast](http://www.noa.gr/forecast), [www.meteo.gr](http://www.meteo.gr)), visited by a large number of end-users
- A computer centre including several clusters of parallel processing



#### 4.1.13 SOGRAPE ([www.sograpevinhos.com](http://www.sograpevinhos.com)), Portugal



##### *Description of the legal entity and its main tasks, with an explanation of how its profile matches the tasks in MED-GOLD*

SOGRAPE is a family-owned company, leader in Portugal, with strong international presence and currently one of the strongest groups in the Iberian wine sector, aiming to take an active role in the consolidation of the sector to the Iberian and European level.

SOGRAPE is grounded in technologically advanced means and equipment, developed know-how in critical areas such as production and winemaking process, an international distribution operations network (fruit of partnerships developed with strong international groups such as Bacardi -Martini group and Pernod Ricard ), and a set of employees with training and high quality in the different areas of the organization, allowing its progress and developing in a sector increasingly marked by competition and competitiveness worldwide. Approximately 80 % of its production is exported, the main external markets are Belgium, France, USA, UK, Canada, Netherlands, Spain, Italy and Germany. SOGRAPE was considered by the World Association of Journalists and Writers of Wines and Spirits ([WAWWJ](http://www.waww.org)) as " The World's Best Winery " in 2015 and again in 2016.

SOGRAPE farms 750 ha of prime quality vineyards in 6 wine appellations of Portugal and is integrated in a family-owned business holding having wineries in Spain, Argentina, Chile and New Zealand and import and distribution companies in the UK, USA, Angola, Brazil and China. The holding posts annual turnovers over 200 million euros and has more than 900 collaborators. Best known Portuguese brands are MATEUS, SANDEMAN, GAZELA, FERREIRA and CASA FERREIRINHA.

SOGRAPE has in-house R&D department developing active research projects covering the whole wine production value chain, from viticulture to market. Climate change is one of 5 main axis for research priorities. SOGRAPE joins knowledge-sharing networks for wine both at the national (ADVID, PORVID) and international (OENOVITI) levels.

SOGRAPE will share data on climate-driven wine production operations and validate services as to suitability for real-life conditions. SOGRAPE will participate actively in the dissemination of results.

##### *Role description*

On the sector of grape / wine production, SOGRAPE VINHOS will provide historical data relevant for the project, will help co-design suitable and efficient climate services that will provide value for adaptation of the wine business to climate change. We will also perform real-life evaluation of pilots and prototypes resulting from the project and join in dissemination actions.

##### *Curriculum vitae or description of the profile of the persons, including their gender, who will be primarily responsible for carrying out the proposed research and/or innovation activities.*

**Antonio Graça (M)** has a Master's degree in Enology from UTAD (University of Trás os Montes e Alto Douro), Portugal and heads the R&D department of Sogrape Vinhos since 2003. He is also Director of PORVID since 2009. PORVID is an association of public and private institutions that created and manages the Conservation Center for Grapevine Diversity in Portugal, a strategy to detain genetic erosion of Portuguese grapevine varieties. He has more than 30 publications in the field of viticulture and oenology in national and international journals and conferences proceedings. Antonio Graça is an Expert evaluator of research projects with the EC – DG RESEARCH, viticulture expert with the International Organization for Vine and Wine (OIV) and class lecturer with the Superior School of Biotechnology of the Portuguese Catholic University, Bordeaux Sciences Agro in France and Washington State University in the USA. Antonio will be the primary responsible for the research in the project.

**Natacha Fontes (F)** Natacha is a Biologist (Applied Biology Degree, University of Minho, 2005) and finished her PhD (European doctorate, according to Bologna) in Biological Sciences (University of Minho and the University Bordeaux Segalen, Bordeaux, France), passing by nationally renowned laboratories (Laboratory Ecophysiology Plant Molecular, ITQB – University of Lisbon) and international (UMR CNRS Transport des Assimilats, Université de Poitiers, France; Écophysiologie et Génomique fonctionnelle de la Vigne (EGFV), INRA, ISVV, Bordeaux, France), has participated in several national and international

scientific events. She is co-author of several articles in refereed journals and book chapters, and has been involved in several national and international projects. She is responsible for delineating, proposing, implementing, documenting and disseminating studies and R&D projects to value the company, providing support for innovation of products, processes, marketing and organization through the creation and application of new knowledge and solutions to problem solving and creating opportunities.

**Master student (to be hired).** Data analysis, model tests and service evaluation. This student will perform most of production data recovery and deployment of resulting services for the relevant company departments (end-users), recording their feedback and insights on relevance, usability and usefulness.

*List of up to 5 relevant publications, and/or products, services (including widely-used datasets or software), or other achievements relevant to MED-GOLD;*

1. Gishen M., Graça A., Jones G.V. (2016) Proposal for the development of a framework for a globally relevant wine sector climate change adaptation strategy. XI International Terroir Congress, Willamette Valley, OR.
2. Graça A. & Aranha J. (2016) Utilização de SIG e álgebra cartográfica na optimização da amostragem de uvas para controlo de maturação. Forum ALABE 2016, Fátima.
3. Fontes N., Martins J., Graça A. (2016) High-resolution agrometeorological observations to assess impact on grape yield and harvest date. CLIMWINE - Sustainable grape and wine production in the context of climate change, Bordeaux.
4. Fontes N., Martins J., Graça A. (2016) Study of agrometeorological measurements on “terroirs” of Alentejo wine region: impact on grape yield and harvest date variation. Simpósio de Viticultura do Alentejo, Évora.
5. Fontes, N., Martins J., Graça A. (2015) “Characterization of extreme climate events over four winegrowing regions in Portugal”. 19èmes Journées GiESCO 2015, 31 de Maio a 5 de Junho, Gruissan, France, conference paper.
6. Fontes N, Graça A. (2013) “A within-vineyard meteorological network: looking for vineyard-scale climate variability”. 18th International Symposium GiESCO 2013, 7-11 Julho 2013, Porto, Portugal: poster presentation.

*List of up to 5 relevant previous projects or activities, connected to the subject of MED-GOLD;*

**International:**

FP7-project [EUPORIAS](#): stakeholder

H2020-project [MICROWINE](#): member of advisory board

LIFE+ [BIODIVINE](#): end-user

**National:**

[ICONE](#): Consistent Integration and Optimization of Centres of Excellence (public funding grant n. QREN SI I&DT n. 4586)

[RHENOVIMO](#): Creation of strategies to manage water deficit of grapevines in mountain viticulture (self-funded)

*Description of any significant infrastructure and/or any major items of technical equipment, relevant to MED-GOLD proposed work;*

- Network of 20 automated weather stations, deployed in 7 vineyards across 6 of the major wine regions of Portugal
- 5 years worth of 15-minute local vineyard weather data on temperature, relative humidity, wind speed and direction, rainfall, solar radiation and leaf wetness
- 20 years of grape production data (quantitative and qualitative) in different wine regions of Portugal
- 52 years dataset of official vineyard spraying warnings detailing yearly number and dates of first and last during the grapevine's growth cycle.

#### 4.1.14 Universidad Militar Nueva Granada (<http://www.umng.edu.co/>), Colombia



##### *Description of the legal entity and its main tasks, with an explanation of how its profile matches the tasks in MED-GOLD*

Our University is a public institution, which differs from other public universities because most of its budget comes from private sources and just 8% comes from the government. Its origins were in the military but the aim was never to provide military instruction but to prepare them and their families for a civil life. The university was always open to the public and nowadays 95% of the students and all professors are civilians. The university depends on the Ministry of Education, which ranks it among the good universities in Colombia. We have 18.000 students mostly undergraduates distributed in 8 Colleges: 1-Sciences, 2-Engineering, 3-Medicine, 4-Economics, 5-Law, 6-Humanities, 7-Virtual Education, 8- International affairs. In the College of Science, we have Horticulture and Applied Biology as undergraduate programs. Besides that, we have a Masters in Applied Biology and a PhD program in Applied Sciences. This last program is a joint effort of the College of Sciences and the College of Engineering, including departments such as Chemistry, Biology, Physics, Mechatronics, Multimedia and Telecommunications of both colleges.

The 3 professors of our University that are participating in this proposal are part of the above mention PhD program in Applied Sciences. All of them are actively engaged in research groups closely tied to agricultural systems in our country, mainly coffee and cut flowers, pests and pathogens, as well as pollination with native bees and agroecosystems modelling.

The University is located in a 87 Ha 30 km north of Bogotá, with a sophisticated infrastructure of laboratories, green houses, and world class facilities for distance education and computer science.

##### *Role description*

The University will contribute on PW6 with a novel work on modelling agroecosystems of coffee. Linking this coffee work with climate services will open a wide opportunity to explore the possibilities of new potential areas for coffee growing in Colombia as well as in other countries, like Brazil. Both countries are the most important coffee producers in South America. This work will also help policymakers and researchers (WP6) to be prepared for consequences of climate change on the communities that will be impacted by that.

##### *Curriculum vitae or description of the profile of the persons, including their gender, who will be primarily responsible for carrying out the proposed research and/or innovation activities.*

**José Ricardo Cure (M)** - PhD. full professor UMNG – Ecosystem Modelling (coffee, common beans, cut flowers, bumblebee pollination), pest control, wild bee pollination. Undergraduate studies in Colombia, Graduate studies in Brazil and the USA. Working experience in Colombia and Brazil. Field experience in agroecosystems and wild bee diversity and pollination with *Bombus atratus*. Administrative experience in basic and applied research. **69** research papers. Awarded the highest medal “Gran Cruz” of his University. Emeritus Professor from Universidad de San Martín in Tarapoto, Peru.

**Daniel Rodríguez (M)** - PhD. full professor UMNG – Biological control, genetics and modelling (Coffee berry borer, *Tuta absoluta*, modelling). Undergraduate and graduate studies at the National University of Colombia having received for his work the special recognition as “Meritoria” in three occasions. Field experience in coffee and the coffee berry borer in Colombia. **72** research papers.

**Maria Mercedes Perez (F)** - PhD. candidate, full professor UMNG – Ecophysiologically and agriculture. Research and extension with small farmers. Undergraduate and graduate studies at Universidad Nacional de Colombia having received a recognition as “Meritoria”. Field experience with small farmers in diverse cultures of the Andes in Colombia: flower industry, aromatic plants and tomato. Awarded a medal from the University for her extension program with the rural sector with small farmers in various municipalities of Colombia. **20** research papers

##### *List of up to 5 relevant publications, and/or products, services (including widely-used datasets or software),*

<i>or other achievements relevant to MED-GOLD;</i>
<p><u>Fenologia e dinâmica populacional da broca do café <i>Hypothenemus hampei</i> (Ferr.) relacionadas às fases de desenvolvimento do fruto.</u></p> <p><u>Phenology and population dynamics of the coffee berry borer <i>Hypothenemus hampei</i> (Ferr.) in relation to the phenological stages of the berry</u></p> <p>JR Cure, RHS Santos, JC Moraes, EF Vilela, AP Gutierrez</p> <p>Anais da Sociedade Entomológica do Brasil (neotropical Entomology)</p> <p><u>Tritrophic analysis of the coffee (<i>Coffea arabica</i>)-coffee berry borer [<i>Hypothenemus hampei</i> (Ferrari)]-parasitoid system</u></p> <p>AP Gutierrez, A Villacorta, JR Cure, CK Ellis</p> <p>Anais da Sociedade Entomológica do Brasil (Neotropical Entomology). 27 (3), 357-385</p> <p><u>A coffee agroecosystem model: I. Growth and development of the coffee plant</u></p> <p>D Rodríguez, JR Cure, JM Cotes, AP Gutierrez, F Cantor</p> <p>Ecological Modelling 222 (19), 3626-3639</p> <p><u>A coffee agroecosystem model: II. Dynamics of coffee berry borer</u></p> <p>D Rodríguez, JR Cure, AP Gutierrez, JM Cotes, F Cantor</p> <p>Ecological modelling 248, 203-214</p> <p>Andrew Paul Gutierrez, Jose Miguel Cotes.</p> <p>Ecological Modelling. Submitted.</p> <p><u>A model of bean (<i>Phaseolus vulgaris</i> L.) growth types I–III: factors affecting yield</u></p> <p>AP Gutierrez, EJ Mariot, JR Cure, CSW Riddle, CK Ellis, AM Villacorta</p> <p>Agricultural systems 44 (1) 35-63</p>
<i>List of up to 5 relevant previous projects or activities, connected to the subject of MED-GOLD;</i>
<ul style="list-style-type: none"> <li>• Climate within unheated greenhouses. Prediction model for cut rose production in Colombia. <u>Goals:</u> 1. Quantify variability in temperature within unheated greenhouses of “Tradicional” and “Espacial” greenhouse designs. 2. Quantify how outdoor air temperature and light intensity affect air temperature inside the green house. <u>Participants:</u> Universidad de Los Andes (Colombia), University of New Hampshire (USA), Universidad Militar Nueva Granada (Colombia), Asocolflores (Colombia).</li> <li>• Integration of local knowledge and technology for sustainable coffee production in Brazil and Colombia with emphasis on integrated pest management. 2006-2007. <u>Goals:</u> Interchange of coffee researchers from Colombia and Brazil in order to develop a common framework for planning future research. <u>Participants:</u> Brazil - Universidade Federal de Viçosa, MG, Empresa de Pesquisa Agropecuária de Minas Gerais (EPAMIG). Colombia –, Universidad Militar Nueva Granada, Centro Nacional de Investigaciones de Café (CENICAFE). Financiado conjuntamente por el CNPq (Brazil) y Colciencias (Colombia)</li> <li>• Development of a general object-oriented model system based on the “Physiological Based Demographics Model System Approach”, 2014 – 2015. Goals: Because of the underlying commonality of the biological processes, this proposal seeks to develop a free-access general object-oriented model system that can be parameterized using field and laboratory data. This system would greatly enhance the analysis of agroecosystems in Colombia and worldwide. Participants: Universidad Militar Nueva Granada (Colombia), and CASAS-Global (USA).</li> </ul>
<i>Description of any significant infrastructure and/or any major items of technical equipment, relevant to MED-GOLD proposed work;</i>
<p>The University Campus has a research station with laboratory and greenhouse facilities for ecology, entomology, phytopathology (fungus, phytoplasmas and viruses), biological control and bioorganic chemistry. On the same campus, the University has developed a high quality institute for virtual education with all facilities for multimedia development and internet communication. This for sure represents an opportunity to facilitate interactions in real time with an international community of researchers, as in the proposal we are here presented.</p>



#### 4.1.15 University of Leeds (<http://www.see.leeds.ac.uk/home/>), UK



##### *Description of the legal entity and its main tasks, with an explanation of how its profile matches the tasks in MED-GOLD*

The University of Leeds is one of the largest research-intensive universities in Britain, with world class centres of excellence that includes cross-cutting work on Climate Change and related topics. The School of Earth and Environment (SEE) is a large School with strengths across atmospheric sciences, environmental social sciences and decision-making. SEE includes the Sustainability Research Institute (SRI), which is the largest grouping of environmental social scientists in the UK with expertise in the translation of science into policy and practice across a range of environmental issues. Within SRI, sits the Climate Change Adaptation Group (CCAG), headed by Prof Suraje Dessai. This interdisciplinary group focuses on four main areas: climate services and users' needs with regards to climate information; production of climate information and knowledge and its use in decision-making; managing climate change uncertainty; and perceptions of climate risks. The partners from the University of Leeds have extensive experience in conducting qualitative and quantitative research methods including interviews, workshops and surveys.

##### *Role description*

The University of Leeds will lead WP5 on the engagement, validation and exploitation of pilot applications with the MED-GOLD community. It will also lead the assessment of the vulnerability and critical decisions of the sectors of interest in WP1, support the appraisal of needs in each of the climate services in WP2-4 and perform the assessment of the value and benefits of each of the climate services developed to the end-users involved in WP2-4.

##### *Curriculum vitae or description of the profile of the persons, including their gender, who will be primarily responsible for carrying out the proposed research and/or innovation activities.*

**Dr Marta Bruno Soares (F)** is an expert on climate information end-users needs across Europe, and the value of climate information in decision-making processes. She is Co-I on the Copernicus Climate Change Service (C3S) projects SECTEUR and QA4Seas, leading work packages on engagement and assessment of user requirements and information needs across Europe. She was work package leader on the EU FP7 EUPORIAS project on the assessment of users' needs for seasonal to decadal climate predictions, covering 8 European economic sectors. She was also responsible for the users' engagement in the EUPORIAS climate services prototype on Land Management Decisions. She sits on the FP7 PRIMAVERA advisory board (Process based climate sIMulation: AdVances in high-resolution modelling and European climate Risk Assessment) and works closely with the World Energy and Meteorological Council. She is also an external reviewer for the Copernicus Climate Change Services and the H2020 ERANET for Climate Services.

**Professor Suraje Dessai (M)** is an internationally recognised expert on the management of climate change uncertainties, perception of climate risks and the science-policy interface in climate change science, impacts and adaptation. He has published over 50 peer-reviewed papers in journals such as Science and Global Environmental Change, 10 book chapters and edited 2 journal special issues. He is an IPCC Lead Author on the chapter "Foundations for Decision-making" for the Intergovernmental Panel on Climate Change (IPCC) Working Group 2 (Impacts, Adaptation and Vulnerability) Fifth Assessment Report and also serves on the IPCC's Task Group on Data and Scenario Support for Impact and Climate Analysis (TGICA). He is the recipient of a European Research Council Starting Grant on Advancing Knowledge Systems to Inform Climate Adaptation Decisions – Project ICAD (2012-2016) and was also involved in another European FP7 project entitled Bottom-up Climate Adaptation Strategies towards a Sustainable Europe (BASE). He is also a member of the ESRC Centre for Climate Change Economics and Policy (CCCEP). Prof Dessai is a member of the Editorial Advisory Panel in Social Science and Policy for Nature Climate Change and Associate editor of Climate Risk Management (Elsevier).

##### *List of up to 5 relevant publications, and/or products, services (including widely-used datasets or software), or other achievements relevant to MED-GOLD;*

- Bruno Soares, M., Daly, M., Dessai, S. (forthcoming) Assessing the value of seasonal climate forecasts for decision-making. WIRES Climate Change.
- Bruno Soares, M., Alexander, M., and Dessai, S. (forthcoming) Sectoral uses of climate information in

<p>Europe: a synoptic overview. Submitted to Climate Services.</p> <ul style="list-style-type: none"> <li>• Falloon, P., Bruno Soares, M., Manzanar, R. et al. (forthcoming) The Land Management Tool: developing a climate service in Southwest UK. Submitted to Climate Services.</li> <li>• Bruno Soares, M. and Dessai, S. (2016) Barriers and enablers to the use of seasonal climate forecasts amongst organisations in Europe. <i>Climatic Change</i>. 137 (1), 89-103. doi:10.1007/s10584-016-1671-8</li> <li>• Bruno Soares, M. and Dessai, S. (2015) Exploring the use of seasonal climate forecasts in Europe through expert elicitation. <i>Climate Risk Management</i>. 10, 8-16 doi:10.1016/j.crm.2015.07.001</li> <li>• Bruno Soares, M., Gagnon, A. S., &amp; Doherty, R. M. (2012). Conceptual elements of climate change vulnerability assessments: a review. <i>International Journal of Climate Change Strategies and Management</i>, 4(1), 6-35.</li> </ul>
<i>List of up to 5 relevant previous projects or activities, connected to the subject of MED-GOLD;</i>
<ul style="list-style-type: none"> <li>• SECTEUR (2016-2017) Sector Engagement for Copernicus Climate Change Service, Translating European User Requirements, funded by European Centre for Medium Range Weather Forecasts (ECMWF) Copernicus. Leeds leads on assessing users' needs with regard to climate impact indicators across a range of economic sectors in Europe.</li> <li>• QA4Seas - Quality Assessment Strategies for Multi-model Seasonal Forecasts (2016-2017) funded by ECMWF Copernicus. QA4Seas aims to develop a strategy for the evaluation and quality control of the multi-model seasonal forecasts provided by the Copernicus Climate Change Service (C3S) to respond to the needs of a wide range of stakeholders. Leeds leads on the assessment of user requirements for the evaluation and quality control of climate data.</li> <li>• EUPORIAS (2012-2017): European Provision Of Regional Impact Assessment on a Seasonal-to-decadal timescale. The project aimed to develop semi-operational climate services prototypes on the seasonal timescale. Leeds led the research on the user needs (budget of €1 million).</li> </ul>
<i>Description of any significant infrastructure and/or any major items of technical equipment, relevant to MED-GOLD proposed work;</i>
N/A

#### 4.1.16 University of Thessaly (<http://nitlab.inf.uth.gr/NITlab/>), Greece



##### *Description of the legal entity and its main tasks, with an explanation of how its profile matches the tasks in MED-GOLD*

The Department of Electrical and Computer Engineering of the University of Thessaly is a well-known institute for higher education in Greece. The Networks and Telecommunications laboratory focuses its activities in the areas of wireless networks, mobile communications, security of telecommunications and applications and services for smart cities. The lab members' research profiles show a complementary background expertise in different areas in networking, including wireless networks and protocols, signal processing, distributed computing, sensors, video and media transmission, network security and energy-efficient networking. International collaborations strengthen ties with prestigious scientific and industrial institutions from abroad. The ongoing research is not limited in theoretical optimization approaches, but includes significant implementation-based research work, which has resulted in many prototype implementations, in multiple networking fields and mainly in SDN and wireless networks. This work is based on experimentation and benchmarking on the NITOS testbed, an integrated testbed with heterogeneous facilities, which focuses on supporting experimentation-based research in the area of wired and wireless networks.

##### *Role description*

UTH will strongly support the development of ICT platform in WP1, contribute to the upscaling on the pilot services on olive oil and wine in the Thessaly region, and support the communication activities in WP6 and the overall management of MED-GOLD

##### *Curriculum vitae or description of the profile of the persons, including their gender, who will be primarily responsible for carrying out the proposed research and/or innovation activities.*

**Prof. Thanasis Korakis (M)** received the BS and MS degrees from the Informatics and Telecommunication department, University of Athens, in 1994 and 1997 respectively and the PhD degree in Computer and Communications Engineering from University of Thessaly, Greece in 2005, under the supervision of Prof. Leandros Tassioulas. In the summer of 2004, he was a visiting researcher in the Computer Science and Engineering Department, University of California, Riverside. From 2005 to 2006, he was a research scientist with the department of Electrical and Computer Engineering, Polytechnic University, NY. From 2006 to 2012 he was a research assistant professor in the same department. Currently, he is an assistant professor in the Electrical and Computer Engineering Department, University of Thessaly. His research interests are in the field of wireless networks with emphasis on access layer protocols, cooperative networks, directional antennas, quality-of-service provisioning and network management. From 2007 to 2012 he was a voting member of the IEEE 802.16 standardization group. He served as a publication chair for WiOpt 2007, TPC chair of WiNTECH 2010, TPC chair of Tridentcom 2011, general chair of Tridentcom 2012, chair of EMUTools 2013 and chair of WINMEE 2016.

**Giannis Kazdaridis (M)**, obtained his Bachelor and Master degree from University of Thessaly from the department of Computer & Communications Engineering. He is a PhD candidate in the same department under the supervision of Prof. Leandros Tassioulas and assistant Prof. Thanasis Korakis since March 2013. He is actively participating in several European projects related to wireless networks experimentation, as well as development and provisioning of wireless testbeds, such as OneLab, OpenLab, CREW, FLEX, SMS, SUNRISE. His research interests are in the field of wireless networks and wireless sensor networks and more specifically, on the design and development of low-power sensor nodes, on energy harvesting techniques in the same domain and on designing and developing energy monitoring equipment/tools for smart-objects/wireless infrastructure. In UTH, he is principal investigator for the hardware related design and development.

**Stavroula Maglavera, (F)** Electrical and Computer Engineer, B.Sc. She focuses on high-level coordination and on strategic developments. She is specialised in the field of ICT and she gained expertise on designing and executing international scale events in ICT. Her skills encompass exploitation, promotion, and

dissemination of technology, and IPR issues. Extensive experience in providing consulting services supporting Public Administration and organisations in the formation and implementation of national and regional strategies for the development and management of ICT applications (i.e. "Business Plan of Telemedicine in Greece for the Greek Ministry of Health", "Evaluation of Business Plan for the Greek Ministry of Economy, Development of eHealth applications for Greek Pilot sites through their participation in ICT for Health projects of the EC). With more than twenty four years of hands-on experience in European (FP3, FP4, FP5, FP6, FP7, CIP), Nationally & Regionally funded programmes and in project management, she still maintains an active interest on design and implementation of research projects in the field on ICT. Her current research interests comprise Networked Information Systems, ICT for Health, e-Inclusion, and e-Government. She is involved in scientific and business committees dealing with medical informatics. She was the coordinator of the INCONET-GCC FP7 project. Participates in SMARTFIRE, FLEX, EINS, MAZI and CHIC projects. She collaborates with DG INFSO as a reviewer and an evaluator for FP6/FP7 and H2020 projects.

*List of up to 5 relevant publications, and/or products, services (including widely-used datasets or software), or other achievements relevant to MED-GOLD;*

- N. Makris, Ch. Zarafetas, S. Kechagias, T. Korakis, I. Seskar, and L. Tassioulas, "Enabling Open Access to LTE network components; the NITOS testbed paradigm", IEEE Soft5G, London, 17 April 2015.
- D. Stavropoulos, G. Kazdaridis, N. Makris, H. Niavis, I. Igoumenos, T. Korakis and L. Tassioulas, "Enabling experimentation in mobile sensing scenarios through 4G networks: the NITOS approach", in the proceedings of EuCNC 2015, Paris, France, 29 June - 2 July 2015
- G. Kazdaridis, D. Stavropoulos, V. Maglogiannis, T. Korakis, S. Lalis, L. Tassioulas, "NITOS BikesNet: Enabling Mobile Sensing Experiments through the OMF Framework in a city-wide environment", in the proceedings of IEEE MDM 2014, Brisbane, Australia, 15-18 July 2014
- D. Stavropoulos, A. Dadoukis, T. Rakotoarivelo, M. Ott, T. Korakis and L. Tassioulas, "Design, Architecture and Implementation of a Resource Discovery, Reservation and Provisioning Framework for Testbeds", WINMEE, Bombay, India, May 25 2015.
- S. Keranidis, G. Kazdaridis, V. Passas, T. Korakis, I. Koutsopoulos, L. Tassioulas, "Online Energy Consumption Monitoring of Wireless Testbed Infrastructure through the NITOS EMF Framework" (Best Paper Award), in the proceedings of ACM WinTech 2013, ACM Mobicom 2013, Miami, Florida, 30 September 2013.
- H. Niavis, G. Kazdaridis, T. Korakis and L. Tassioulas, "Enabling sensing and mobility", in the proceedings of TridentCom, Thessaloniki, Greece, June 2012
- Stratos Keranidis, Dimitris Giatsios, Thanasis Korakis, Iordanis Koutsopoulos, Leandros Tassioulas, Thierry Rakotoarivelo, Thierry Parmentelat "GENI WiMAX performance: Evaluation and comparison of two campus Testbeds"

*List of up to 5 relevant previous projects or activities, connected to the subject of MED-GOLD;*

UTH and NITOS has participated to multiple experimentation driven EU projects: FLEX (FIRE LTE testbeds for open experimentation), SMARTFIRE, OneLab, OPNEX, N-CRAVE, REDUCTION, CONTENT, PERSUIT, FIRESense, MAZI, dREDBOX, 5GHAUL. Additionally, NITOS is the main wireless facility of OpenLab, an EU project that federates experimental facilities all over Europe and of FIBRE, a FIRE project that federates testbeds between Europe and Brazil and SMARTFIRE that federates testbeds between Europe and South Korea. NITOS is also part of the CREW facilities through the 2<sup>nd</sup> CREW open call and XI-FI through the relevant XI-FI open call. Finally, NITOS is one of the main wireless facilities of FED4FIRE, a FIRE project with the scope of integrating the FIRE infrastructure.

The full list of project follows:

- FP7 – FLEX (612050): FIRE LTE testbeds for open experimentation (coordinator)
- FP7 – SMARTFIRE (611165): Enabling SDN Experimentation in WiReless Testbeds exploiting Future Internet Infrastructure in South KoRea and Europe (coordinator)
- FP7 – FIBRE (288356): Future Internet testbeds/experimentation between BRazil and Europe – EU
- FP7 – CONTENT (318514): Convergence of wireless optical network and IT resources in support of cloud services
- FP7 – CREW (258301): Cognitive Radio Experimentation World
- FP7 – OPENLAB (287581): Extending FIRE testbeds and tools



- FP7 – XI-FI (604590): eXperimental Infrastructures for the Future Internet
- H2020 – MAZI (687983): A DIY networking toolkit for location-based collective awareness (coordinator)
- H2020 – 5G-XHaul (671551): Dynamically Reconfigurable Optical-Wireless Backhaul/Fronthaul with Cognitive Control Plane for Small Cells and Cloud-RANs
- H2020 – dREDBox (687632): Disaggregated Recursive Datacentre-in-a-Box

*Description of any significant infrastructure and/or any major items of technical equipment, relevant to MED-GOLD proposed work;*

**NITOS testbed**, is an integrated testbed with heterogeneous facilities that focus on supporting experimentation-based research in the area of wired and wireless networks. NITOS is remotely accessible and open to the research community 24/7. It has been used from hundreds of experimenters all over the world.

## Section 5: Ethics and Security

### 5.1 Ethics

If you have entered any ethics issues in the ethical issue table in the administrative proposal forms, you must:

- submit an ethics self-assessment, which:
  - describes how the proposal meets the national legal and ethical requirements of the country or countries where the tasks raising ethical issues are to be carried out;
  - explains in detail how you intend to address the issues in the ethical issues table, in particular as regards:
    - research objectives (e.g. study of vulnerable populations, dual use, etc.)
    - research methodology (e.g. clinical trials, involvement of children and related consent procedures, protection of any data collected, etc.)
    - the potential impact of the research (e.g. dual use issues, environmental damage, stigmatisation of particular social groups, political or financial retaliation, benefit-sharing, malevolent use , etc.).
- provide the documents that you need under national law(if you already have them), e.g.:
  - an ethics committee opinion;
  - the document notifying activities raising ethical issues or authorising such activities

### 5..2 Security<sup>3</sup>

**Please indicate if your project will involve:**

- activities or results raising security issues: NO
- 'EU-classified information' as background or results: N

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<sup>3</sup> Article 37.1 of Model Grant Agreement. *Before disclosing results of activities raising security issues to a third party (including affiliated entities), a beneficiary must inform the coordinator — which must request written approval from the Commission/Agency; Article 37. Activities related to 'classified deliverables' must comply with the 'security requirements' until they are declassified; Action tasks related to classified deliverables may not be subcontracted without prior explicit written approval from the Commission/Agency.; The beneficiaries must inform the coordinator — which must immediately inform the Commission/Agency — of any changes in the security context and — if necessary — request for Annex 1 to be amended (see Article 55)*



To:

Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301, 0012Rome  
Bldg C59, Room 10A Sp. 118

Dear Coordinator,

On behalf of the organisation I represent, **BCSD Portugal – Business Council for Sustainable Development**, part of WBCSD's global network, I would like to confirm our interest in the project proposal titled ***"Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)"*** co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the advisory board.

We strongly support the MED-GOLD project as it is designed to cluster with our ongoing project titled "Meet 2030: Energy, climate and economic growth – business opportunities in Portugal", and this we believe will result in mutual benefit and increased aggregate impact on society at both European and global level.

BCSD supports the MED-GOLD project because we consider necessary to identify potential opportunities and innovations which can create competitive advantage for companies, by way of promoting a sustainable growth of the economy. In such a way MED-GOLD will be able to position traditional Mediterranean such as grape, olive and durum wheat food systems competitively in the market in the medium and long term.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Sofia Santos

Secretary General of BCSD Portugal

22<sup>nd</sup> December 2016

Andrew Paul Gutierrez  
Professor in Ecosystem Science and Director of CASAS  
BERKELEY, CALIFORNIA 94720  
DEPARTMENT OF ENVIRONMENTAL SCIENCE, POLICY & MANAGEMENT  
Ecosystem Sciences Division  
203 Mulford Hall

UNIVERSITY OF CALIFORNIA, BERKELEY

CASAS

your partner in establishing



To: Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301, 00123 Rome  
Bldg C59, Room 10A Sp. 118

Dear Coordinator,

On behalf of the organisation/initiative I represent, *Center for the Analysis of Sustainable agricultural systems (CASASglobal NGO)*, I would like to confirm our interest in the project proposal titled "*Turning climate-related information into added value for traditional MEDiterranean Grape, Olive and Durum wheat food systems (MED-GOLD)*" co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the advisory board.

We strongly support the MED-GOLD project as it is designed to cluster with our ongoing projects titled Analysis of the Geographic Distribution and Abundance of Invasive Species Under Extant Weather and Climate Change, and this we believe will result in mutual benefit and increased aggregate impact on society at both European, the United States and the global level. We have 30 years of experience modeling grape and olive systems, and these models would be an important adjunct to MED-GOLD project.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

A handwritten signature in black ink, appearing to read "A. P. Gutierrez".

Andrew Paul Gutierrez,

Professor Emeritus & CEO CASASglobal.NGO

12/06/2016

**IAM.B ISTITUTO AGRONOMICO MEDITERRANEO DI BARI**

3 March 2017

D12 01/153

Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301  
00123 Rome  
Bldg C59, Room 10A Sp. 118

Dear Coordinator,

On behalf of the organisation I represent, *CIHEAM-Mediterranean Agronomic Institute of Bari (CIHEAM-IAMB)*, I would like to confirm our interest in the project proposal titled "*Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)*" co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the advisory board.

We strongly support the MED-GOLD project as it is designed to build upon our project titled **Adaptation to CLimate Change of the Mediterranean Agricultural Systems (ACLIMAS)**, and this we believe will result in mutual benefit and increased aggregate impact on society at both Euro-Mediterranean and global level.

"Climate change solutions" in agriculture is one of the CIHEAM key topics and thematic priorities (CIHEAM Strategic Agenda 2025). Furthermore, The CIHEAM represents one of the main actors on the road of conceptualisation, adoption and on-ground implementation of the policies and management solutions for the climate change resilient Mediterranean agricultural systems.

As agreed all cost for meeting participation will be covered by the project.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Maurizio Raeli  
Director





REF: EUROCLIP  
04/01/2016

Carlo.buontempo@ecmwf.int

To:

Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301, 0012Rome  
Bldg C59, Room 10A Sp. 118

Dear Coordinator,

The project proposal titled "*Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)*" co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)] is of relevance for the development of climate services in Europe.

We support all projects that are designed to build upon Copernicus Climate Change Services tools and datasets and plan to interact with the activities of its Sectoral Information System. For this reason I would be happy to be involved in the MED-GOLD project as a member of the advisory board should the project be funded.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Yours sincerely

Carlo Buontempo



ECMWF Shinfield Park, Reading RG2 9AX, UK

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28 December 2016

Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301, 0012Rome  
Bldg C59, Room 10A Sp. 118

Dear Coordinator,

I would like to confirm my interest in the project proposal titled "*Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)*" co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the advisory board.

I strongly support the MED-GOLD project as it is designed to build upon my ongoing projects in climate change adaptation with various clients, and also an international collaborative project towards development of a globally relevant climate change adaptation framework<sup>1</sup>. I believe this involvement will result in mutual benefit and increased aggregate impact on society at both European and global level.

I guarantee that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall remain confidential, and guarantee not to forward to third parties any technical/scientific material unless authorised by the MED-GOLD Consortium.

Mark Gishen.



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<sup>1</sup> XI International Terroir Congress, 2016 Proposal for the development of a framework for a globally relevant wine sector climate change adaptation strategy. Access at: <http://tinyurl.com/zgoz3z6>



Thünen Institute (MA) · Bundesallee 50 · 38116 Braunschweig/Germany

Alessandro Dell'Aquila  
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ITALY

## Institute of Market Analysis

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[www.thuenen.de](http://www.thuenen.de)

your References

our References

Date  
2017-01-27

### Support letter on collaboration between MED-GOLD and FACCE MACSUR

Dear Coordinator,

On behalf of the network project FACCE MACSUR (<http://macsur.eu>), I would like to confirm our interest in the project proposal titled *“Turning climate-related information into added value for traditional MEDiterranean Grape, Olive and Durum wheat food systems (MED-GOLD)”* co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017/Action b. In particular, we would like to be involved in the MED-GOLD proposal as a member of the stakeholder or the advisory board.

We strongly support the MED-GOLD project as it is designed to develop strong links to stakeholders in the agriculture supply chain. A co-operation between MACSUR and MED-GOLD would facilitate access to results of cutting edge modelling results produced by MACSUR and allow more regional engagement with stakeholders and consideration of their perspectives in MACSUR. This will result in mutual benefit and increased aggregate impact on society at both European and global level.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Kind regards,



Prof. Dr. Martin Banse

Direktor Marktanalyse, Thuenen Institute, Braunschweig  
(Coordinator FACCE MACSUR Knowledge Hub)

The Johann Heinrich von Thünen Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries – Thünen Institute in brief – consists of 14 specialized institutes that carry out research and provide policy advice in the fields of economy, ecology and technology.  
President: Prof. Dr. Folkhard Isermeyer

Institute of Market Analysis · Head: Dr. Martin Banse · Secretariat: +49 531 596-5302

# MICHIGAN STATE UNIVERSITY

To:

Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese  
301, 00123 Rome  
Bldg C59, Room  
10A Sp. 118

Dear Coordinator,

On behalf of Michigan State University and the Agricultural Modeling Intercomparison and Improvement (AgMIP), we would like to confirm my interest in the project proposal titled "Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)" co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the advisory board.

We strongly support the MED-GOLD project as it is designed to build upon our ongoing global research effort carried on with our AgMIP project goals and mission. I feel sure that the results in mutual benefit and increased aggregate impact on society at both European and global level.



**College of  
Natural Science**

**Department of Earth and  
Environmental Sciences**

288 Farm Lane  
Room 207 Natural Science  
East Lansing, MI 48824-1115

517-355-4626  
Fax: 517-353-8787  
[www.geology.msu.edu/](http://www.geology.msu.edu/)

The AgMIP seeks to improve the characterization of world food security under climate change and to enhance adaptation capacity in both developing and developed countries. More in particular, we use climate information to help farmers make more informed decisions, which is the core research of the MED-GOLD.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Sincerely,

University Foundation Professor of Ecosystems Science  
Coordinator of AgMIP Soil Initiative

Email: [basso@msu.edu](mailto:basso@msu.edu)  
Office: (517) 353-9009



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
OFFICE OF OCEANIC AND ATMOSPHERIC RESEARCH  
Climate Program Office (OAR/CPO)  
1315 East-West Highway  
Silver Spring, MD 20910  
Telephone: 301-734-1256

Dr Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301, 00123 Rome  
Bldg C59, Room 10A Sp. 118

March 3<sup>rd</sup>, 2017

Dear Coordinator,

I would like to express my personal interest in the project proposal titled "*Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)*" co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. Given that my scientific and managerial experience is of relevance to this project, I'd be willing to serve in a scientific advisory capacity once the MED-GOLD advisory board is constituted.

Overall, I'd like to strongly support the MED-GOLD project as it has the prospects to advance the application of climate information for the development of services useful to farmers, as within the scope of the Global Framework for Climate Services (GFCS) and the National Drought Information System (NIDIS) NOAA is involved in, and this I believe will result in mutual benefits and increased aggregate impact on society at both European and global level.

Sincerely,

Annarita Mariotti

Director, Modeling, Analysis, Predictions and Projections (MAPP) Program





## Open Source Geospatial Foundation

info@osgeo.org    www.osgeo.org

14525 SW Millikan #42523  
Beaverton, Oregon  
United States  
97005-2343

94 Goose Pond Rd  
Canaan, NH  
United States  
03741

To  
Dr. Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301, 00123 Rome  
Bldg C59, Room 10A Sp. 118

**Subject: Support letter for MED-GOLD proposal under Horizon 2020 (Draft)**

On behalf of the organisation I represent, OSGeo Source Geospatial Foundation (OSGeo), I would like to confirm our interest in the project proposal titled "*Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)*" coordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the advisory board.

We strongly support the MED-GOLD project as it is designed to build upon our ongoing software projects and outreach initiative such as Geo4All, and this we believe will result in mutual benefit and increased aggregate impact on society at both European and global level.

The proposal is of high societal importance and the results would be useful beyond the targeted Mediterranean region to enhance agricultural productivity and ensure global food security.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Yours sincerely,

Venkatesh Raghavan  
President,  
Open Source Geospatial Foundation (OSGeo)

---

info@osgeo.org

Open Source Geospatial Foundation

www.osgeo.org



To:

Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301, 0012 Rome  
Bldg C59, Room 10A Sp. 118

Dear Dr. Dell'Aquila,

On behalf of the 4PRIMA Coordinated and Support Action (CSA) initiative that I represent, with this letter I would like to show our endorsement to the project proposal "Turning climate-related information into added *value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)*" co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)].

We believe that fostering the collaboration between MED-GOLD proposal and 4PRIMA initiative could represent a formidable value added for the process of tackling Mediterranean area challenges. Both of the initiatives, in fact, take as reference food systems in the Mediterranean area as key issues to be addressed in order to build healthier and more sustainable societies, and recognize the relevance of improving decision-making processes within climatically-influenced agricultural contexts. Improving synergies between the two initiatives would therefore increase aggregate impacts generated on societies at both Mediterranean and European level.

Given the potential positive effects that collaboration between 4PRIMA and MED-GOLD could generate, we would like to be involved in the MED-GOLD proposal and, in particular, we would like to join MED-GOLD proposal as member of its advisory board.

The organisation I represent guarantees that any confidential information or documents that have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Hoping in a fruitful collaboration,

Best regards,

Angelo Riccaboni  
PRIMA CHAIR

A handwritten signature in blue ink, appearing to read "Angelo Riccaboni", is written over the printed name and title.



Gregory V. Jones  
Southern Oregon University  
Division of Business, Communication  
and the Environment  
1250 Siskiyou Blvd.  
Ashland, OR 97520

Thursday, December 22, 2016

Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301, 0012Rome  
Bldg C59, Room 10A Sp. 118

Dear Coordinator,

On behalf of Southern Oregon University, I would like to confirm our interest in the project proposal titled "Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)" coordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the advisory board.

We strongly support the MED-GOLD project as it is designed to build upon numerous research and outreach efforts ongoing in the state of Oregon and elsewhere in the United States. We strongly believe that proposed project will result in mutual benefit and increased aggregate impact on society at both the European and global level.

Our advisory role in supporting the MED-GOLD project will allow us to both have input in the project and learn from the efforts as they apply to important European crops. As such the interactions will allow us to address similar issues in numerous agribusinesses in Oregon and the United States.

The organization I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organization, and guarantees not to forward to third parties any technical/scientific material if not authorized by the MED-GOLD Consortium.

Sincerely,

A handwritten signature in black ink, appearing to read 'G. Jones', with a stylized flourish at the end.

Gregory V. Jones  
Director, Division of Business, Communication, and the Environment  
Professor, Environmental Science and Policy



To:

Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301, 00123 Rome  
Bldg C59, Room 10A Sp. 118

Dear Coordinator,

On behalf of the project I am coordinating, *LIFE ADAPT2CLIMA*, I would like to confirm our interest in the project proposal titled "*Turning climate-related information into added value for traditional MEditerranean Grape, OLive and Durum wheat food systems (MED-GOLD)*" co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the advisory board.

We strongly support the MED-GOLD project as it is designed to build upon our ongoing project titled *LIFE ADAPT2CLIMA* (<http://www.adapt2clima.eu/en/>), and this we believe will result in mutual benefit and increased aggregate impact on society at both European and global level since olive cultivation and its adaptation to climate change is targeted in both projects.

The project I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Name of the authorised representative:

*Dr. Christos Giannakopoulos, LIFE ADAPT2CLIMA coordinator*

Signature of the authorised representative:

30/1/2017





AGRIVENDITA SRL  
VIA ROMA 8  
MADREGOLO DI COLLECCHIO (PR)  
P.IVA – 01908780347  
TEL – 0521800974  
agrivendita@gmail.com

To:

Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301, 00123 Rome  
Bldg C59, Room 10A Sp. 118

Dear Coordinator,

On behalf of the organisation/initiative I represent, *AGRIVENDITA s.r.l.*, I would like to confirm our interest in the project proposal titled *"Turning climate-related information into added value for traditional Mediterranean Grape, Olive and Durum wheat food systems (MED-GOLD)"* co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the stakeholder board.

We strongly support the MED-GOLD project as it is designed to cluster with our ongoing initiatives for the optimization of the use of fertilizers in a long term period, and this we believe will result in mutual benefit and increased aggregate impact on society at both European and global level.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Collecchio , 24<sup>th</sup> of february

**AGRIVENDITA S.R.L.**  
Via Roma, 8 - 43044 Madregolo di Collecchio (PR)  
Partita IVA e Cod. Fisc. 01908780347  
Tel. e Fax 0521-800974



To:

Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301, 0012Rome  
Bldg C59, Room 10A Sp. 118

Dear Coordinator,

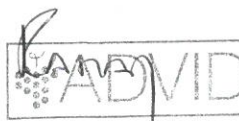
On behalf of the organisation/initiative I represent, ADVID – Associação para o Desenvolvimento da Viticultura Duriense, I would like to confirm our interest in the project proposal titled *“Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)”* co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the stakeholder.

We strongly support the MED-GOLD project as it is in line with one of our strategic areas of research (Impact of climate change in viticulture) and we believe that it will result in mutual benefit and increased aggregate impact on society at both European and global level.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Name of the authorised representative: Rosa Amador

Signature of the authorised representative:

 **ADVID** ASSOCIAÇÃO PARA O DESENVOLVIMENTO  
DA VITICULTURA DURIENSE  
Quinta de Santa Maria, 5050-100, Vila Real

December 19, 2016

To:  
Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301,  
0012Rome  
Bldg C59, Room 10A Sp.  
118

Dear Coordinator,

On behalf of the organisation/initiative I represent, *Basque Culinary Center Foundation*, I would like to confirm our interest in the project proposal titled "*Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)*" co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the stakeholder board.

We strongly support the MED-GOLD project as it is designed to cluster with our ongoing Culinary Interaction initiative, and this we believe will result in mutual benefit and increased aggregate impact on society at both European and global level.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Name of the authorised representative: Elena Urdaneta

Signature of the authorised representative:

December 15<sup>th</sup>, 2016





CON. CER. SOCIETA' COOPERATIVA AGRICOLA  
ORGANIZZAZIONI PRODUTTORI  
VIA GIACOMO MATTEOTTI 57  
71121 FOGGIA  
C.F./P.IVA 03463860712

To:

Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301, 00123 Rome  
Bldg C59, Room 10A Sp. 118

Dear Coordinator,

On behalf of the organisation/initiative I represent, *Con. Cer. Società Cooperativa Agricola Organizzazioni Produttori*, I would like to confirm our interest in the project proposal titled "*Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)*" co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the stakeholder board.

We strongly support the MED-GOLD project as it is designed to cluster with our ongoing initiatives for the optimization of the use of fertilizers in a long term period, and this we believe will result in mutual benefit and increased aggregate impact on society at both European and global level.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Name of the authorised representative: Caione Giovanni Nicola

Signature of the authorised representative:

Foggia, 24<sup>th</sup> of february

CON. CER. Soc. Coop. Agr. 



To:

Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301, 0012Rome  
Bldg C59, Room 10A Sp. 118

Dear Coordinator,

On behalf of the organisation/initiative I represent, *Consejo Regulador D.O. Rías Baixas*, I would like to confirm our interest in the project proposal titled "*Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)*" coordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the advisory board.

We strongly support the MED-GOLD project as it is designed to build upon our ongoing project titled "*Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)*", and this we believe will result in mutual benefit and increased aggregate impact on society at both European and global level.

The MED-GOLD project aims to develop climate services that enable sustainable production and resilience enhancement face to climate change for olive, grape, and durum wheat crop systems which are the basis for producing olive oil, wine and pasta.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Name of the authorised representative: D. Ramón Huidobro Vega  
General Manager

Signature of the authorised representative

December, 22th 2016



Consejo Regulador

Plaza da Pedreira, 10  
Edif. Pazo de Mugartegui  
36002 Pontevedra. España  
Tel. 986 85 48 50  
Fax 986 86 45 46  
www.doriasbaixas.com  
consejo@doriasbaixas.com



# Consorzio Agrario di Ravenna Soc. Coop. a r.l.

Via Madonna di Genova, 39 – 48033 Cotignola

Telefono 0545/906211 \* Fax 0545/906210

www.consorzioagrarioravenna.it \* e-mail: info@consorzioagrarioravenna.it

Cod. Fisc. e Reg. Imp. 00167.370.394 \* P. IVA 00072430390 \* Iscritta Albo Coop. N. A104586

To:

Alessandro Dell'Aquila

SSPT-MET-CLIM, ENEA, CR Casaccia,

Via anguillarese 301, 00123 Rome

Bldg C59, Room 10A Sp. 118

Dear Coordinator,

On behalf of the organisation/initiative I represent, *Consorzio Agrario di Ravenna Soc. Cons. a r.l.*, I would like to confirm our interest in the project proposal titled "*Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)*" co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the stakeholder board.

We strongly support the MED-GOLD project as it is designed to cluster with our ongoing initiatives for the optimization of the use of fertilizers in a long term period, and this we believe will result in mutual benefit and increased aggregate impact on society at both European and global level.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Name of the authorised representative: Massimo Masetti

Signature of the authorised representative:

Cotignola (RA), 24<sup>th</sup> of february

CONSORZIO AGRARIO DI RAVENNA  
Soc. Coop. a r.l.  
IL DIRIGENTE ADDETTO

To:

Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301,  
00123 Rome  
Bldg C59, Room 10A Sp. 118

Madrid, 10 th February 2017

Dear Coordinator,

On behalf of the organisation I represent, <Cooperativas Agroalimentarias de España>, I would like to confirm our interest in the project proposal titled "*Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)*" co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the advisory board.

We strongly support the MED-GOLD project as we believe it will result in mutual benefit and increased aggregate impact on society at both European and global level.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.



Agustín Herrero González  
Director General de Cooperativas Agro-alimentarias



# FEDERACION ESPAÑOLA DEL VINO

INDUSTRIA Y COMERCIO DE VINOS, VINOS AROMATIZADOS, VINOS ESPUMOSOS, VINOS DE LICOR, MOSTOS, MISTELAS Y VINAGRES

To: Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301,  
0012Rome  
Bldg C59, Room 10A - p. 118

Dear Coordinator,

On behalf of the organisation, I represent, **FEDERACIÓN ESPAÑOLA DEL VINO**, I would like to confirm our interest in the project proposal titled *"Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)"* co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the advisory board.

We strongly support the MED-GOLD project as it is designed to cluster with our ongoing initiative titled *"Wineries for Climate Protection"* and this we believe will result in mutual benefit and increased aggregate impact on society at both European and global level.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Name of the authorised representative: **PABLO ROCA BLASCO**

Signature of the authorised representative:

Madrid, December 22, 2016



To:

Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301, 00123 Rome  
Bldg C59, Room 10A Sp. 118

Dear Coordinator,

On behalf of the organisation/initiative I represent, *FRANCESCO OP SOC.AGR. SOC.CONS ARL*, I would like to confirm our interest in the project proposal titled "*Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)*" co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the stakeholder board.

We strongly support the MED-GOLD project as it is designed to cluster with our ongoing initiatives for the optimization of the use of fertilizers in a long term period, and this we believe will result in mutual benefit and increased aggregate impact on society at both European and global level.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Name of the authorised representative: BRUNO FRANCESCO

Signature of the authorised representative:

Rodigo (MN), 24<sup>th</sup> of february

A handwritten signature in blue ink, appearing to be "Bruno", written over a horizontal line.

Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301, 0012Rome  
Bldg C59, Room 10A Sp. 118

Date

Porto, 6 de Janeiro de 2017

Dear Coordinator,

On behalf of the organisation/initiative I represent, *Instituto dos Vinhos do Douro e Porto*, I would like to confirm our interest in the project proposal titled "*Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)*" co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the stakeholder board.

MED-GOLD project is aligned with the identified needs of the wine sector of the Douro Wine Region, being expectable that it will provide new and relevant tools to be used for adaptation to impending climate change.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.



Manuel de Novaes Cabral

Presidente



INTERNATIONAL  
OLIVE  
COUNCIL

CONSEJO  
OLEICOLA  
INTERNACIONAL

CONSEIL  
OLEICOLE  
INTERNATIONAL

CONSIGLIO  
OLEICOLO  
INTERNAZIONALE

المجلس  
الدولي  
للزيتون

Coordinator of “Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)”

Mr. Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301, 00123 Rome  
Bldg C59, Room 10A Sp. 118

### Letter of Support

The International Olive Council (IOC), represented by the undersigned, IOC Executive Director Abdellatif Ghedira expresses its strong support for the “Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)” proposal submitted by Mr Alessandro Dell'Aquila (ENEA, CR Casaccia, Italy) in response to call SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA). In particular, we would like to be involved in the MED-GOLD proposal as a member of the stakeholder

It believes the proposal agrees with the role and purposes of the IOC and that the results of the research will be beneficial for the olive growing in the EU and elsewhere.

If the project is financed, the IOC is interested in:

- Playing an important role in activities relating to the analysis of the project results and their possible dissemination, if they are of interest to the olive sector.

Such involvement may require reimbursement of the participation expenses of IOC in this activity.

The IOC hereby pledges to maintain confidentiality and to refrain from disclosing any information concerning the development of the project proposal or any information supplied to it by other project partners.

This letter of support does not constitute any obligation on the part of the International Olive Council to be linked exclusively to this project and leaves it entirely free to collaborate with other consortia.

Abdellatif Ghedira  
Executive Director

Madrid, 27 February 2017





Consiglio Nazionale delle Ricerche  
Istituto di Biometeorologia

To:  
Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301, 00123 Rome  
Bldg C59, Room 10A Sp. 118

Dear Coordinator,

On behalf of the organisation I represent, *CNR IBIMET*, I would like to confirm our interest in the project proposal titled "*Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)*" co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the stakeholder board.

We strongly support the MED-GOLD project as it is designed to cluster with our ongoing project OLIVEMIRACLE funded under *FACCE SURPLUS program*, and this we believe will result in mutual benefit and increased aggregate impact on society at both European and global level.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Name of the authorised representative: Antonio Raschi

Signature of the authorised representative:

IL DIRETTORE  
Dr. Antonio Raschi



Name of the coordinator of FACCE SURPLUS OLIVEMIRACLE: Marco Moriondo

Signature of the coordinator of FACCE SURPLUS OLIVEMIRACLE

08 FEB. 2017

# OP La Marca Grains

Soc. Cons. a.r.l.

Strada dei Pioppi, 153 60019 – SENIGALLIA (AN)  
Tel. e Fax: 071/665116 E-Mail: [oplamarcagrains@gmail.com](mailto:oplamarcagrains@gmail.com)

P.IVA e C.F. 02622550420  
REA N. 202317

To:

Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301, 00123 Rome  
Bldg C59, Room 10A Sp. 118

Dear Coordinator,

On behalf of the organisation/initiative I represent, *Op La Marca Grains* I would like to confirm our interest in the project proposal titled "*Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)*" co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the stakeholder board.

We strongly support the MED-GOLD project as it is designed to cluster with our ongoing initiatives for the optimization of the use of fertilizers in a long term period, and this we believe will result in mutual benefit and increased aggregate impact on society at both European and global level.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Name of the authorised representative:

Signature of the authorised representative:

Senigallia, 24<sup>th</sup> of february

OP LA MARCA GRAINS  
Il Presidente  




**REDEA**

**REGIONALNA RAZVOJNA AGENCIJA MEĐIMURJE**

HR - 40000 Čakovec, Bana Josipa Jelačića 22 • OIB 61539263602

tel: +385 (0)40 395 560 • fax: +385 (0)40 395 142

e-mail: [reda@reda.hr](mailto:reda@reda.hr) • [www.reda.hr](http://www.reda.hr)

To:

Alessandro Dell'Aquila

SSPT-MET-CLIM, ENEA, CR Casaccia,

Via anguillarese 301, 0012Rome

Bldg C59, Room 10A Sp. 118

Dear Coordinator,

On behalf of the organisation/initiative I represent, *Regional Development Agency Međimurje REDEA*, I would like to confirm our interest in the project proposal titled "*Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)*" co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the stakeholder board.

We strongly support the MED-GOLD project as it is designed to build upon our ongoing project titled „TRansition paths to sUstainable legume based systems in Europe“ and this we believe will result in mutual benefit and increased aggregate impact on society at both European and global level.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium.

Name of the authorised representative: SANDRA POLANEC MARINOVIĆ, director

Signature of the authorised representative:

20<sup>th</sup> December 2016

REGIONALNA RAZVOJNA AGENCIJA  
MEĐIMURJE D.O.O.  
B. J. Jelačića 22, 40000 Čakovec

Regionalna razvojna agencija Međimurje d.o.o. za regionalni razvoj i poslovne usluge upisana je kod Trgovačkog suda u Varaždinu pod brojem Tt-12/74-2. MBS:07048488. Temeljni kapital: 418.000,00 kn uplaćen u cijelosti. Uprava: Sandra Polanec Marinović  
Poslovni račun kod Međimurske banke d.d. Čakovec: 2392007 - 1100041525





To:

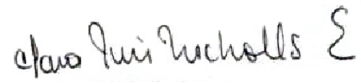
Alessandro Dell'Aquila  
SSPT-MET-CLIM, ENEA, CR Casaccia,  
Via anguillarese 301,  
00123 Rome

Dear Coordinator,

On behalf of the organisation/initiative I represent Sociedad Científica Latinoamericana de Agroecología -SOCLA, I would like to confirm our interest in the project proposal titled *"Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems (MED-GOLD)"* co-ordinated by ENEA under the Horizon 2020 topic SC5-01-2016-2017: Exploiting the added value of climate services [Action b: From climate service concepts to piloting and proof-of-concept (2017 – Research and Innovation Action – RIA)]. In particular, we would like to be involved in the MED-GOLD proposal as a member of the stakeholder board.

We strongly support the MED-GOLD project as it is designed to build upon our ongoing initiative titled *Assessing the resiliency to climate change in Latin American Farming Systems*, and this we believe will result in mutual benefit and increased aggregate impact on society at both European and global level. Identifying and understanding why farming systems resist and recover from extreme climatic events is an urgent matter for the future of agriculture.

The organisation I represent guarantees that any confidential information or documents which have been prepared or are planned to be prepared relating to this proposal shall be circulated only internally to the organisation, and guarantees not to forward to third parties any technical/scientific material if not authorised by the MED-GOLD Consortium



Clara Inés Nicholls, Ph.D.

Presidenta de la Sociedad Científica Latinoamericana de Agroecología (SOCLA)

Simon Bolivar 4150 Depto 401D

Nunoa-Santiago

Chile

February 2, 2017



Italian National Agency for New Technologies,  
Energy and Sustainable Economic Development



Food and Agriculture  
Organization of the  
United Nations

## **Memorandum of Understanding**

between

**Food and Agriculture Organization of the United Nations (FAO)**

and

**Consiglio Nazionale delle Ricerche (CNR)**

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

**Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico  
sostenibile (ENEA)**

**Rome, Italy**

### **PREAMBLE**

This Memorandum of Understanding (MoU) is entered into by the Food and Agriculture Organization of the United Nations with its headquarters in Rome, Italy from one side; and Consiglio Nazionale delle Ricerche, Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria, and Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile, all with headquarters in Rome, Italy.

**Recognizing** that the Food and Agriculture Organization, (hereinafter referred to as "FAO") is a specialized agency of the United Nations system, with a vision for a world free from hunger and malnutrition, where food and agriculture contribute to improving the living standards of all, especially the poorest in an economically, socially and environmentally sustainable manner. It is a knowledge organization with three global goals – eradication of hunger, food insecurity and malnutrition, elimination of poverty through increased food production and rural development and sustainable management and utilization of natural resources for the benefit of all. Within the framework of five Strategic Objectives, FAO works closely with Member Nations and a range of partners at national, regional and global levels to achieve these goals.

**Acknowledging** that Consiglio Nazionale delle Ricerche, Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria, and Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile (hereinafter referred to as "CNR, CRA and ENEA", respectively) are

- **CNR:** The National Research Council of Italy is a public sector research organization with a mission to promote the scientific, technological, economic and social development of the country. CNR is composed of a network of seven departments, 107 research institutes, and over 8 000 researchers, distributed all over the national territory. It covers

8



research and scientific and technological development in the areas of Agriculture and Food Sciences, Bio-Medicine, Engineering, Environmental and Social Sciences among others. CNR was founded in 1923 and was transformed into a public body in 1945. <http://www.cnr.it/>.

- **CRA:** The Council for Agricultural Research and Economics (CRA) is a National Research Organization which operates under the supervision of the Ministry of Agriculture, with general scientific competence within the fields of agriculture, agroindustry, food, fishery, forestry and economics. CRA employs over 1700 researchers and staff, and operates through research and innovation structures distributed throughout national territory, which allows it to widely extend its expertise and proficiency, and to closely operate in conjunction with central administrations, local and regional institutions, companies and various trade, industrial and legal associations. The CRA has been established with the legislative decree n.454/99 and gathers together the experience of two previously independent Institutes: INRAN (Istituto nazionale di Ricerca per gli Alimenti e la Nutrizione) and INEA (Istituto Nazionale di Economia Agraria). <http://sito.entecra.it/>.
- **ENEA:** The National Agency for new technologies, renewable energy and sustainable economic development is a public sector organization operating in the fields of energy, the environment and new technologies to support Italy's competitiveness and sustainable development. It promotes and carries out basic, applied research and innovation technology activities including through the development of prototypes and product industrialization; technology transfer and dissemination studies, measurements and assessments, training and information aimed at broadening sectoral expertise, and public awareness. ENEA employs over 2 600 staff, distributed across its 11 research centres. It was established in 2009 reorganizing prior research organizations established in 1952. <http://www.enea.it>.

**Conscious** that CNR, CRA and ENEA, among other activities, operate for the development and innovation of the national agro-industrial production system, with the objective of improving its sustainability and efficiency. CNR, CRA and ENEA's activities include basic research and development and transfer of enabling technologies, including in partnership with the private sector and the provision of advanced technological services to the agro-industrial production system.

**Noting** that FAO and CNR, CRA and ENEA have a history of close collaboration, particularly in the areas of plant genetic resources, integrated pest management, nutrition, remote sensing, diagnostics of animal diseases and water management. In addition, both CNR, and CRA have placed their germplasm collections under the Multilateral System of the International Treaty on Plant Genetic Resources for Food and Agriculture.

**Recognizing** that FAO and CNR, CRA and ENEA have a common global interest in promoting improved coherent action for achieving integrated approaches to sustainability; improvement of diet quality; and agricultural innovation in developing countries.

**Considering** that cooperation between FAO and CNR, CRA and ENEA would mean better access and exchange of information, knowledge and expertise in the field of food and agriculture



sustainability that can benefit the services that FAO provides to its Members within the framework of the Strategic Objectives of the Organization.

**Acknowledging** the FAO and CRA partnership agreement of 7 December 2011, FAO and CNR, CRA and ENEA (hereinafter referred to as “the Parties”) have agreed to the following:

### **Article 1. Purpose of this Memorandum of Understanding**

The purpose of this MoU is to provide a framework for cooperation between the Parties with the overall goal of enhancing the sustainability of the food production and nutrition in developing countries.

### **Article 2. Joint Collaboration**

2.1 The Parties shall consult on matters mentioned in Article 1 that are of mutual interest and that capitalize on the comparative advantages of the Parties. The broad thematic areas where synergies will be established upon mutual agreement between the Parties are, among others:

- integrated approaches to sustainability;
- agricultural innovation;
- food and nutrition;
- processing and value addition of agri-food products.

2.2. Whenever desirable, the Parties may seek each other's co-operation with a view to promoting the development of specific activities in fields of common interest and may conclude specific agreements for joint action with the aim of attaining objectives of mutual interest, including through exchange of letters will be concluded, as required.

2.3 The present MoU implies no financial commitment by any Party. Activities to be implemented under this MoU are subject to the availability of staff and financial resources. The Parties shall enter into separate agreements, within the framework of this MoU, for matters which may involve the commitment of funding or other resources. Agreements concluded between any or all of the Parties under this MoU shall define agreed activities, manner and extent of participation by each Party, financial aspects, including in-kind contributions, and arrangements on intellectual property rights.

2.4 The conclusion of this MoU does not preclude FAO from entering into separate agreements with one or more of the other Parties to undertake activities that do not fall within the framework of this MoU.

2.5. Possible activities in the areas of collaboration between the Parties are specified in Annex I, which is an integral part of this MoU. The Parties shall meet for coordination and review of the joint activities to be developed as described in Annex I as deemed necessary, and may agree, in such meetings, to modify the activities and work plans based upon their review, such modifications entering into effect upon approval by all the Parties of the records of those meetings.

2.6 Subject to the Parties' respective regulations, rules and policies and the present MoU, the Parties may jointly develop proposals to be submitted to funding agencies. Neither Party shall



engage in any fundraising activity with third parties in the name of or on behalf of the other Party, without their prior express written approval in each case.

### **Article 3. Knowledge Sharing, Exchange of Information and Documents**

To the extent possible, the Parties will promote knowledge sharing, including the exchange of information and documents concerning matters of common interest. The Parties shall have free and unrestricted access, where feasible, to all information developed under this MoU for their internal use.

### **Article 4. Use of Logo, Name and Emblem**

The Parties agree not to use in any press release, memo, report or other published disclosure related to this MoU or in any other document, annex or arrangement related thereto, the name, logo or emblem of any other Party without prior written consent of the Party concerned.

### **Article 5. Intellectual Property Rights**

5.1 Intellectual property rights, in particular copyright, of material such as information, software and designs, made available by CNR, CRA and ENEA or FAO to be used to carry out the activities under this MoU shall remain with the originating Party. If deemed appropriate, authorizations for the use of such materials by the other Parties will be addressed in agreements concluded in accordance with Article 2 above.

5.2. Copyright of materials and reports, as well as rights to any other intellectual property, developed jointly by the Parties will be vested in FAO. CNR, CRA and ENEA will enjoy perpetual, royalty-free, non-exclusive and non-transferable licenses to use such materials for non-commercial purposes. Notwithstanding the foregoing, if deemed appropriate due to the materials in question and the respective contribution made by each Party, the Parties may conclude separate agreements to govern intellectual property rights on a case-by-case basis in respect of materials jointly developed by two or more Parties under this MoU in accordance with Article 2 above.

### **Article 6. Confidentiality Clause**

None of the Parties nor their personnel shall communicate to any other person or entity confidential information made known to it by another Party in the course of the implementation of this MoU nor shall it use this information to private or company advantage. This provision shall survive the expiration or termination of this MoU.

### **Article 7. Communications – Focal Points of Contact**

Any notification, notice or request required to be given or made under this MoU shall have been duly made or given when addressed in writing as follows:

#### **FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS – FAO**

Viale delle Terme di Caracalla

Rome 00153, Italy

Attention: Karin Nichterlein, Officer-in-Charge  
Research and Extension Unit

Email address: Karin.Nichterlein@fao.org  
Telephone number: +39 0657055529

#### **CONSIGLIO NAZIONALE DELLE RICERCHE - CNR**

Piazzale Aldo Moro, 7 - 00185, Rome, Italy

Attention: Dr. Francesco Loreto

Direttore del Dipartimento di Scienze Bio-agroalimentari

Email address: [direttore.disba@cnr.it](mailto:direttore.disba@cnr.it)

Telephone number: +39 0649937802

#### **CONSIGLIO PER LA RICERCA IN AGRICOLTURA E L'ANALISI DELL'ECONOMIA AGRARIA - CRA**

Via Nazionale, 82 - 00184, Rome, Italy

Attention: Stefano Bisoffi

Direzione Centrale Attività Scientifiche

Email address: [direzionescientifica@entecra.it](mailto:direzionescientifica@entecra.it)

Telephone number: Tel. +39 0647836250

#### **AGENZIA NAZIONALE PER LE NUOVE TECNOLOGIE, L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE - ENEA**

Lungotevere Thaon di Revel, 76 - 00196, Rome, Italy

Attention: Dott. Massimo Iannetta

Responsabile Unità Tecnica Sviluppo Sostenibile ed Innovazione del Sistema Agro-Industriale (UTAGRI)

Email address: [massimo.iannetta@enea.it](mailto:massimo.iannetta@enea.it)

Telephone number: +39 0630483339

#### **Article 8. Privileges and Immunities**

Nothing in this MoU or in any other document, annex or arrangement related thereto, shall be construed as constituting a waiver of privileges or immunities of FAO or its personnel, nor as extending any privileges or immunities of FAO to CNR, CRA and ENEA or to their personnel.

#### **Article 9. Applicable Law**

The present MoU and any annex, document or arrangement relating thereto, shall be governed by general principles of law to the exclusion of any single national system of law. Such general principles of law shall include the UNIDROIT General Principles of International Commercial Contracts 2010.

#### **Article 10. Settlement of Disputes**

10.1 Any dispute between any of the Parties, arising out of the interpretation or execution of the present MoU, or any document or arrangement relating thereto, shall be settled by negotiations and mutual agreement.



10.2 If the parties to the dispute are unable to reach an agreement on any question in the dispute or on a mode of settlement other than arbitration, any party/Parties to the dispute shall have the right to request arbitration in accordance with the Arbitration Rules of UNCITRAL, as at present in force by sending a request for arbitration to all other Parties to this MoU.

10.3 In the event that the request for arbitration names only one claimant and one respondent, and no Party has exercised its right to joinder or intervention in accordance with the paragraphs below, the claimant and the respondent shall each appoint one arbitrator within 15 days after the expiry of the period during which Parties can exercise their right to joinder or intervention. The two arbitrators shall appoint the third arbitrator, who shall act as presiding arbitrator.

10.4 In the event that more than two Parties are named in the request for arbitration or at least one party exercises its right to joinder or intervention in accordance with the paragraphs below, the claimant(s) shall jointly appoint one arbitrator and the respondent(s) shall jointly appoint the other arbitrator, both within 15 days after the expiry of the period during which Parties can exercise their right to joinder or intervention. The two arbitrators shall appoint the third arbitrator, who shall act as presiding arbitrator.

10.5 Any Party to this MoU may intervene in any arbitration proceedings by submitting a written notice of claim, counterclaim or cross-claim against any Party to this MoU, provided that such notice is also sent to all other Parties to this MoU within 30 days from the receipt by such intervening Party of the relevant request for arbitration or notice of claim, counterclaim or cross-claim.

10.6 Any Party to this MoU named as respondent in a request for arbitration, or a notice of claim, counterclaim or cross-claim, may join any other Party to this MoU in any arbitration proceedings by submitting a written notice of claim, counterclaim or cross-claim against that Party, provided that such notice is also sent to all other Parties to this MoU within 30 days from the receipt by such respondent of the relevant request for arbitration or notice of claim, counterclaim or cross-claim.

10.7 The Parties to the dispute agree to be bound by any arbitration award rendered in accordance with this Article as the final adjudication of any such dispute. Any joined or intervening Party shall be bound by any award rendered in accordance with this Article even if such Party chooses not to participate in the arbitration proceedings.

#### **Article 11. Entry into Force and Duration**

The present MoU shall be signed by all the Parties and will enter into force on the date of the last such upon signature. This MoU shall remain in force for a period of three (3) years following its entry into force and be renewable for successive similar periods thereafter by written agreement of the Parties, based upon successful past implementation.

#### **Article 12. Notification and Amendments**

12.1 Each Party shall promptly notify the others in writing of any anticipated or actual material changes that will affect the execution of this MoU.

12.2 Any amendment to this MoU shall be effected only on the basis of written mutual consent by the Parties. Such amendments shall enter into force one month following notifications of consent by all the Parties. Notwithstanding the foregoing, the work plans to be developed as described in Annex I may be modified through agreement reached at review meetings, as provided in Article 2 above, as reflected in the records of those meetings.

### **Article 13. Withdrawal**

13.1 Any Party may withdraw from this MoU by giving three (3) months' written notice to the other Parties. By withdrawing, the rights and obligations of the withdrawing Party under this MoU shall cease to be effective. Such withdrawal shall not affect commitments entered into in good faith prior to withdrawal in accordance with this Article. Any withdrawal from this MoU shall be without prejudice to: (a) the orderly completion of any ongoing collaborative activity; and (b) any other rights and obligations of the Parties accrued prior to the date of withdrawal under this MoU or any legal instrument executed pursuant to this MoU.

13.2 Unless agreed otherwise by the remaining Parties, the MoU shall remain in effect for the remaining Parties.

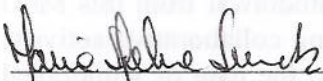
This MoU will be drawn up in English in four copies, with one copy for each Party. Either copy is of equal validity.



**IN WITNESS WHEREOF**, the duly authorized representatives of the Parties affix their signatures below.

On behalf of the Food and  
Agriculture Organization of  
the United Nations (FAO)

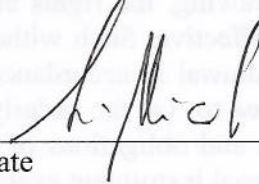
Maria Helena Semedo  
Deputy Director-General,  
Natural Resources Coordinator



Date 23-06-2018

On behalf of Consiglio Nazionale delle  
Ricerche (CNR)

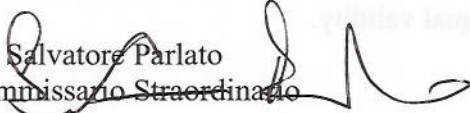
Prof. Luigi Nicolais  
Presidente



Date

On behalf of Consiglio per la ricerca in  
agricoltura e l'analisi dell'economia agraria  
(CRA)

Dr. Salvatore Parlato  
Commissario Straordinario

  
23/06/18

Date

On behalf of Agenzia nazionale per le nuove  
tecnologie, l'energia e lo sviluppo economico  
sostenibile (ENEA)

Prof. Federico Testa  
Commissario



### Provisional Areas of Collaboration

On the basis of this MoU between FAO and CNR, CRA and ENEA, and in view of the desire to strengthen collaboration on matters of mutual interest and ensure harmony and synergy in the work of the Parties, the following areas of collaboration have been identified for implementation, subject to the availability of staff and financial resources. The implementation of the collaborative activities under this MoU shall be subject to the application of the respective rules and procedures of each Party.

#### 1. FAO Strategic Objectives (SO): The five SO of the Organization are as follows:

- SO 1: Contribute to the eradication of hunger, food insecurity and malnutrition.
- SO 2: Increase and improve provision of goods and services from agriculture, forestry and fisheries in a sustainable manner.
- SO 3: Reduce rural poverty.
- SO 4: Enable more inclusive and efficient agricultural and food systems at local, national and international levels.
- SO 5: Increase the resilience of livelihoods to threats and crises.

#### 2. Partners' Strategic Priorities:

- Advancing scientific research for addressing the multiple food and agricultural challenges, including sustainability, nutrition and climate change.
- Promoting innovation of the agricultural production system.
- Partnering and networking to share knowledge and expertise.

#### 3. Collaborative Activities:

The main areas identified for collaborative activities are - Integrated approaches to sustainability; Strengthening agricultural innovation; Food and nutrition; and Processing and value-addition of agri-food products. The collaboration will contribute to the products and services of the FAO Strategic Objectives - SO2 and SO 4. Specific joint activities are as below:

##### 3.1 Integrated approaches to sustainability: Collaboration between FAO and partner institutions will support development of sustainable agriculture production systems and systems level approaches through creating synergies and promoting interdisciplinarity. Joint activities to be undertaken as follows:

Raise awareness, promote networking and information sharing in the ongoing initiatives as below:

- International Year of Soils 2015 and such forthcoming events.
- Sustainability Assessment of Food and Agriculture systems (SAFA).
- Organic farming research networks and technology platforms (e.g. RIRAB, PTBio Italia, TP Organics).
- World Overview of Conservation Approaches and Technologies (WOCAT).



- Globally Important Agricultural Heritage Systems (GIAHS).
- Sustainable Food Value Chain Development (SFVC knowledge platform).

Promote capacity development, scientific exchanges, research case studies, data sharing and modeling, initially in the following areas:

- Sustainable soil management within the framework of the Global Soil Partnership.
- Ecosystem characterization approaches, including support to the preparation of the *State of the World's Biodiversity for Food and Agriculture*.
- Gene bank database management best practices for plant and animal genetic resources, (e.g. CRA PlantA-Res, CNR BioGenRes, FAO WIEWS and FAO DAD-IS).
- Implementation of relevant international normative frameworks, including on Chemicals and Pesticide Conventions, Global Plans of Action and Global Assessments on Genetic Resources for Food and Agriculture.

**3.2 Strengthening agricultural innovation:** FAO and the partner institution will jointly develop capacities, for promotion of agriculture innovation in developing countries, by strengthening the research institutes and technical advisory services, developing case studies, information exchange on tools and technologies. Specific activities will capitalize, and expand ongoing collaborations as follows:

- Joint development of projects and/or initiatives for capacity development for agriculture innovation systems, building on existing projects and experiences led by FAO and CNR.
- Share proven technologies and practices of partner institutions through FAO's TECA platform and build synergies with the AGRITRANSFER platform, developed and managed by CRA.
- CNR, CRA and ENEA will provide a brief description of the various technical expertise on food and agriculture innovations available in their institutions and can be tapped by FAO as appropriate.
- Undertake joint studies on impact of research, building on the ongoing collaboration between FAO and ENEA.
- Identify innovative tools for supporting habitat monitoring and locust early warning system to support management of Transboundary Plant Pests and Diseases.

**3.3 Food and Nutrition:** Collaboration between FAO and partner institutions will focus on improvement of diet quality through food-based sustainable interventions, in particular in developing countries, and sharing experience of Italy. The main areas of joint activities will be on harmonization of guidelines, application or validation of analytical methods and devices, capacity development, knowledge exchange and data sharing development of experiential case studies. Overall, it would contribute to the development of an integrated platform with cross-linked databases on reference materials, reference methods, food composition, food consumption, markers (for products and processes), for food quality and safety and traceability of the whole value chain. The focus of joint activities will be in the following areas:



## Dietary Guidelines

- Develop common methodologies for promoting dietary diversity as a key determinant of nutritional outcomes, with a focus on integrating sustainability criteria into food based dietary guidelines. Develop a graphical representation of dietary guidelines (e.g. pyramids, plate).
- Jointly prepare a Concept Note with CRA - Centro di ricerca per gli alimenti e la nutrizione (CRA-NUT) to design a tool for developing *low-cost* healthy diets, focusing on low-income countries.
- Exchange information on evaluation of the impact of dietary guidelines on dietary changes, including on methodology and indicators.

## Food Composition and Food Consumption

- Development of integrated databases through data sharing, comparison and analysis (e.g. Food Composition Tables, Italian individual Food Consumption Data with the FAO/WHO Global Individual Food Consumption Data Tool).
- Harmonize methodologies for use of food composition data for labeling, and for assessing the coverage of nutrient requirements, considering labels as an educational tool.
- Evaluation of diet adequacy and coverage of requirements from dietary consumption databases at population level and in specific subgroups. Study introduction in diet of healthy, added-value raw materials obtained from native and/or adapted minor cereal and pseudo-cereal crops.

## Food Safety

- Share scientific methodologies and strengthen capacity development for fungal early detection and analytical determination of mycotoxin contamination, as well as other environmental and microbiological contaminants.
- Strengthen risk analysis of contaminants, translocation from agricultural soils to plants and through the entire supply chain.
- Research studies on metabolomics of plant-pathogen interaction that play a role in the plant defense strategies toward pathogens infection.
- Enhancing sustainable food safety knowledge and awareness in developing countries through joint training initiatives, scientific exchanges and capitalization of existing networks for future cooperation.

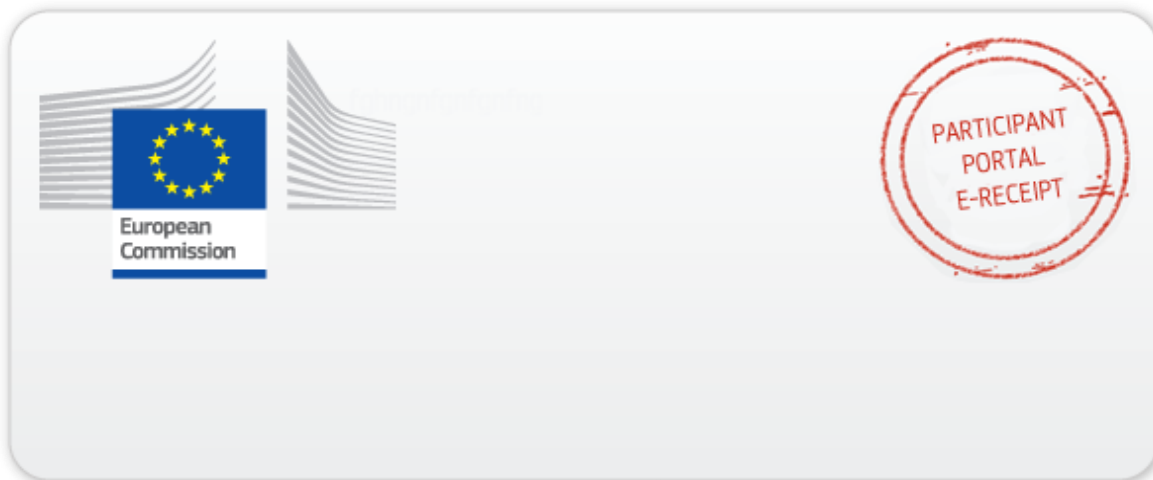
**3.4 Processing and value addition of agri-food products:** FAO and the partner institutions will jointly explore opportunities for collaboration on issues related to agro-food industry development, value chain development, and capacity development in value addition for developing and transitional countries. This may include:

- Information exchange and study tours to the relevant institutions.
- Facilitate exchange visits to relevant Italian institutions and research centres as well as related local value adding enterprises.



- Explore the development of joint work and collaboration on food processing, value addition and local food enterprise including agro-food industry appraisals, institutional development and capacity enhancement.
  - Facilitate exchange of updated technologies and processes for agro-food industries.
  - Facilitate exchange on farmer-market linkages and various certification schemes (e.g. voluntary and geographic origin standards) that are essential to create value in food systems.
4. **Joint Implementation:** For the implementation of the above-mentioned activities, a detailed annual/biennial work plan shall be developed and focal points assigned as appropriate. The work plan may be initiated by any Party, but will require the approval of all the Parties for implementation. In order to facilitate and guide effective implementation *ad hoc* Working Groups composed of focal points and others, shall be established. The Working Groups shall meet for coordination and to review implementation on a regular basis and, as needed, amend the work plan. Meetings of the Working Groups should be virtual to the extent possible or physical meetings could be conducted if they can be arranged in conjunction with official events.





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