

# THE MED-GOLD LIVING LAB

Online training, 25 May – 20 June 2020

Project proposal by Team RE-WINE constituted by:

- Andrés Alegría
- Balakrishnan Solaraju Murali
- Carlo Zucca
- Christiana Olusegun
- Raed Hamed

Mentor: Marta Bruno Soares

## **Content**

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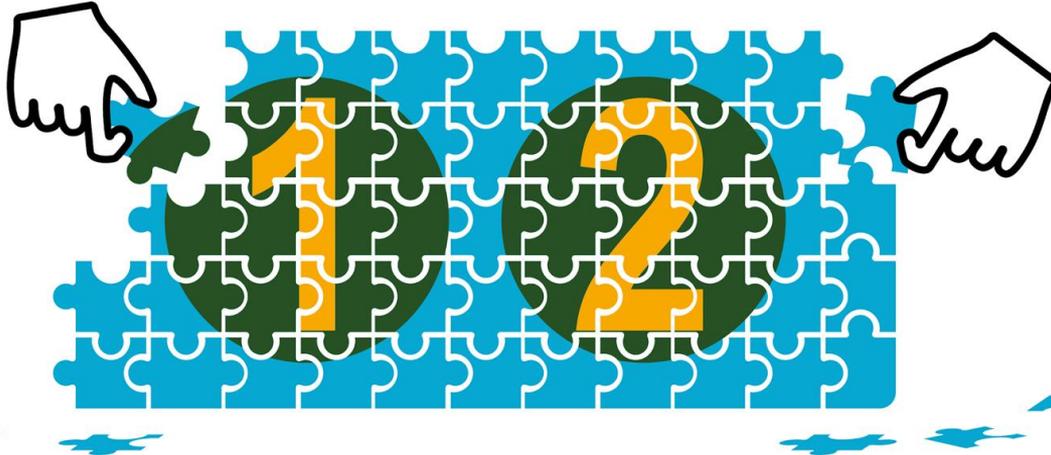
## Challenge

**How to decide if and when should the vineyard manager use climatology or an available seasonal forecast to calculate the stock of protection products he/she will need for his vineyard?**

## Proposed solution / Objectives

- 1 Improve the operational decision making of SOGRAPE.
- 2 Provide tailored real-time climate information to SOGRAPE through an intuitive and easy-to-use visualisation tool, thus helping them make decisions on protection product purchase, based on the seasonal forecast or climatological forecast.

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SOGRAPE

## Core tasks



In-depth interviews to gain understanding of needs and motivations of the end-users

**Co-designing** meetings by SOGRAPE and RE-WINE

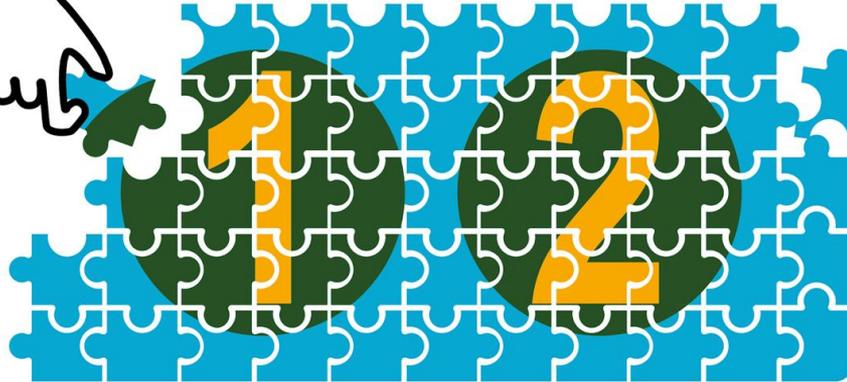
Downscaling of seasonal forecast and evaluation of forecast skill and reliability

Implementation of Economic analysis and business plan

Building visualization tool for operational seasonal forecast system

Iterative testings of the tool's user interface

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SOGRAPE



## Work packages



WP1: Engagement activities



WP2: Assessment of seasonal climate forecast



WP3: Economic assessment



WP4: Development of interactive visualization tool

## Work packages



WP1 will focus on user engagement activities.

### Tasks:



**Task 1.1:** Conduct in depth interviews

**Task 1.2:** Design meetings

**Task 1.3:** Iterative testings of the tool's user interface

### *Deliverables*

**Deliverable 1.1:** Report on the user interviews

**Deliverable 1.2:** Project Dissemination plan

**Deliverable 1.3:** Minutes of the design meeting

## Work packages



WP2 will focus on the assessment of seasonal climate forecast.

### Tasks:



**Task 2.1:** Data collection and preparation (Post-processing the climate model output)

**Task 2.2:** Evaluation of forecast skill of essential climate variable

**Task 2.3:** Application of seasonal forecast predictions

### *Deliverables*

**Deliverable 2.1:** Current status of the seasonal climate forecast systems

**Deliverable 2.2:** Forecast quality assessment of seasonal forecasts

**Deliverable 2.3:** Report on the real-time application of seasonal forecast

## Work packages



WP3 will focus on the Economic assessment.

### Tasks:

- **Task 3.1:** Determine cost and losses parameters
- **Task 3.2:** Translating forecast into action
- **Task 3.3:** Summarizing the information with a tool in mind

### *Deliverables*

**Deliverable 2.1: Approaches for cost and losses estimation**

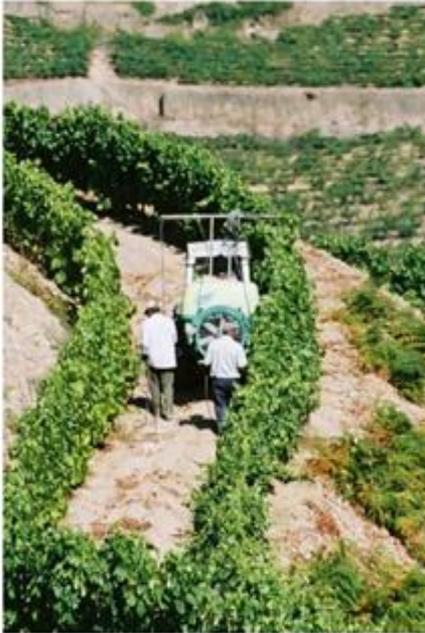
**Deliverable 2.2: Economic assessment report**

**Deliverable 2.3: Recommendation on the best suited climate information**

# Where do we start from?



## PROBLEM DATA



### Data

- Average cost of protection products ordered with 2 week advance: 16 € / kg
- Average cost of protection products ordered with 3 month advance: 11 € / kg
- Average cost of protection products ordered with 6 month advance: 9 € / kg
- Use of protection product on year with SprR > 200 mm = 9.4 kg/ha
- Use of protection product on year with SprR < 100 mm = 4.9 kg/ha
- Average yield on year with SprR > 200 mm = 2.7 ton/ha
- Average yield on year with SprR < 100 mm = 3.2 ton/ha
- Value of grape kg for winemaking = 0.90 €

### Considerations:

- Protection products readily available at any time, do not consider there is «out of stock» possibility.
- Validity of protection products is 12 months, i.e., those not used in the year will be lost.
- You only have one harvest every year
- SprR: spring rainfall, sum of daily rainfall between 21-Apr and 21-Jun
- Despite temperature, humidity, solar radiation and wind playing a role, assume the only driver for protection product use is rainfall

# Theoretical framework for assessing losses and costs

Costs and losses as outcome of forecast-based action

	Yes (SprR > 200 mm)	No (SprR > 200 mm)
Yes Action (forecast)	Cost (i.e. protection products)	Cost + potential other forms of costs (C') (i.e. protection products + skepticism)
No Action (forecast)	Loss (i.e. reduced income from lower harvest)	0

# How does it look for the specific problem data?

Variable	Value
Size (ha)	70
Additional needed protection (kg/ha)	4,5
Costs 2 weeks (val/kg)	16
Costs 3 month (val/kg)	11
Costs 6 month (val/kg)	9
Extra protection during event (kg/ha)	4,5
Average yield loss during event (ton/ha)	0,5

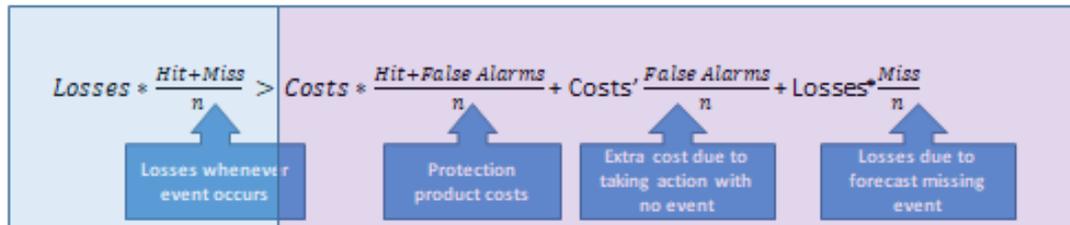
Action status	Costs / kg	Aggregate costs	Total costs and Losses in case of no event	Total costs and Losses in case of event
LD1	16	5040	5040 + Other form of costs	5040
LD3	11	3465	3465 + Other form of costs	3465
LD6	9	2835	2835 + Other form of costs	2835
No Action	0	0	0	35000

# On what conditions would it be cost-effective to consider seasonal forecasts?

	Yes (SprR > 200 mm)	No (SprR > 200 mm)
Yes Action (forecast > = p)	Hit (p)	False Alarm (p)
No Action (forecast < = p)	Miss (p)	Correct Rejection (p)

**Table 1:** Contingency table and possible scenarios for forecast-based action given a probability threshold of  $p$  to trigger action

Over a specific period of time, and assuming that a climatological forecast implies no action, the value of forecast-based action translates into:



## Work packages



WP4 will focus on developing visualization tool.

### Tasks:

- **Task 4.1:** Defining user requirements
- **Task 4.2:** Data management and structure
- **Task 4.3:** Development of visualization tool
- **Task 4.4:** Testing and stable release of the tool

### Deliverables

**Deliverable 4.1:** Technical and user requirements

**Deliverable 4.2:** Data management plan

**Deliverable 4.3:** Visualization tool

