Italian National Agency for New Technologies,
Energy and Sustainable Economic Development

Climate services for agriculture. How to prepare the agricultural sector to climate change

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How ENERO makes green deal alive.
Brussels, june 1st 2022.

Italian National Agency for New Technologies,
Energy and Sustainable Economic Development

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In Europe:

22 million people directly employed in the farming sector;
44 million people gravitating around farming, food processing and retail or services;

Agriculture is the most climate-dependent socio-economic sector.

Climate change is already affecting agriculture!

General framework

- Adaptation to climate change is a fundamental response for agriculture.
- Current intensive agricultural production and food systems cause severe problems (loss of biodiversity, water consumption, air pollutants emission).
- Agricultural sector offers also opportunities for carbon storage.

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Main climate change impacts on the agriculture sector for the main biogeographical regions in Europe.

Credits: EEA Report 04/19, p.18.

Coastal zones
Sea level rise
Intrusion of saltwater

Mediterranean region
Large increase in heat extremes
Decrease in precipitation
Increasing risk of droughts
Increasing risk of biodiversity loss
Increasing water demand for agriculture
Decrease in crop yields
Increasing risks for livestock production
Agriculture negatively affected by spillover effects of climate change from outside Europe

Boreal region
Increase in heavy precipitation events
Increase in precipitation
Increasing damage risk from winter storms
Increase in crop yields

Atlantic region
Increase in heavy precipitation events
Increasing risk of river and coastal flooding
Increasing damage risk from winter storms

Continental region
Increase in heat extremes
Decrease in summer precipitation
Increasing risk of river floods

Mountain regions
Temperature rise larger than European average
Upward shift of plant and animal species
Risk of hail
Risk of frost
Increasing risk from rock falls and landslides

Source: Adapted from EEA (2017b).

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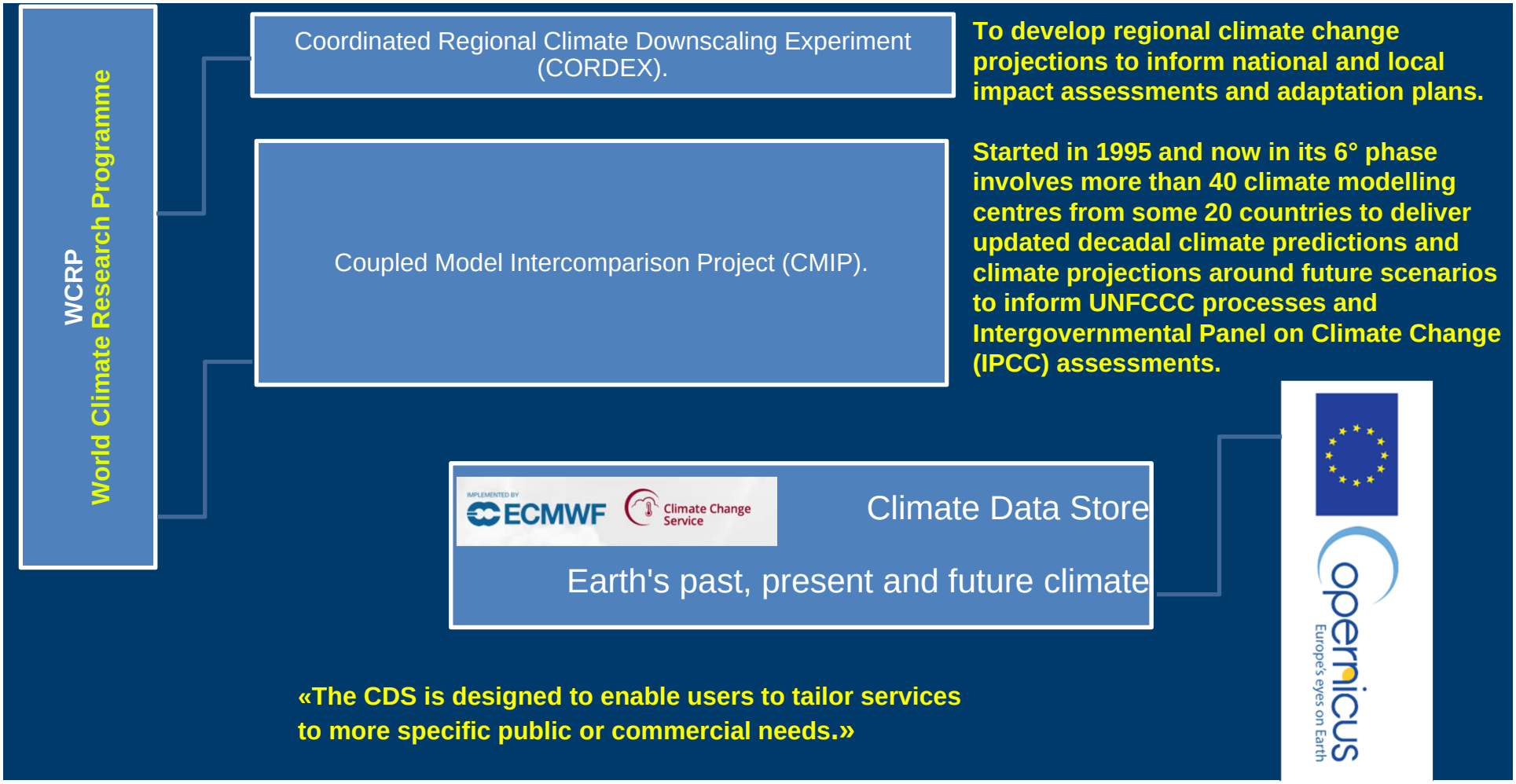

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Climate knowledge path.

Models produce huge amounts of data. Climate simulations basically consist of expensive and time-consuming numerical experiments.	If climate and weather information are available but not used to modify the crop management, their value is lost.
High resolution Seasonal Forecast.	To capture all the phenomena that contribute to local changes.
Dive vaste data sets to find essential variables. IA techniques, visual techniques, etc.	Techniques for mining data and prepare tailored information for the services (eg. trends and projection for extreme events).
Learn from potential users and translate climate information into practice.	Climate services are an interactive and participatory process to support central governments, private companies and local administrations in managing the risk associated with climate variability.

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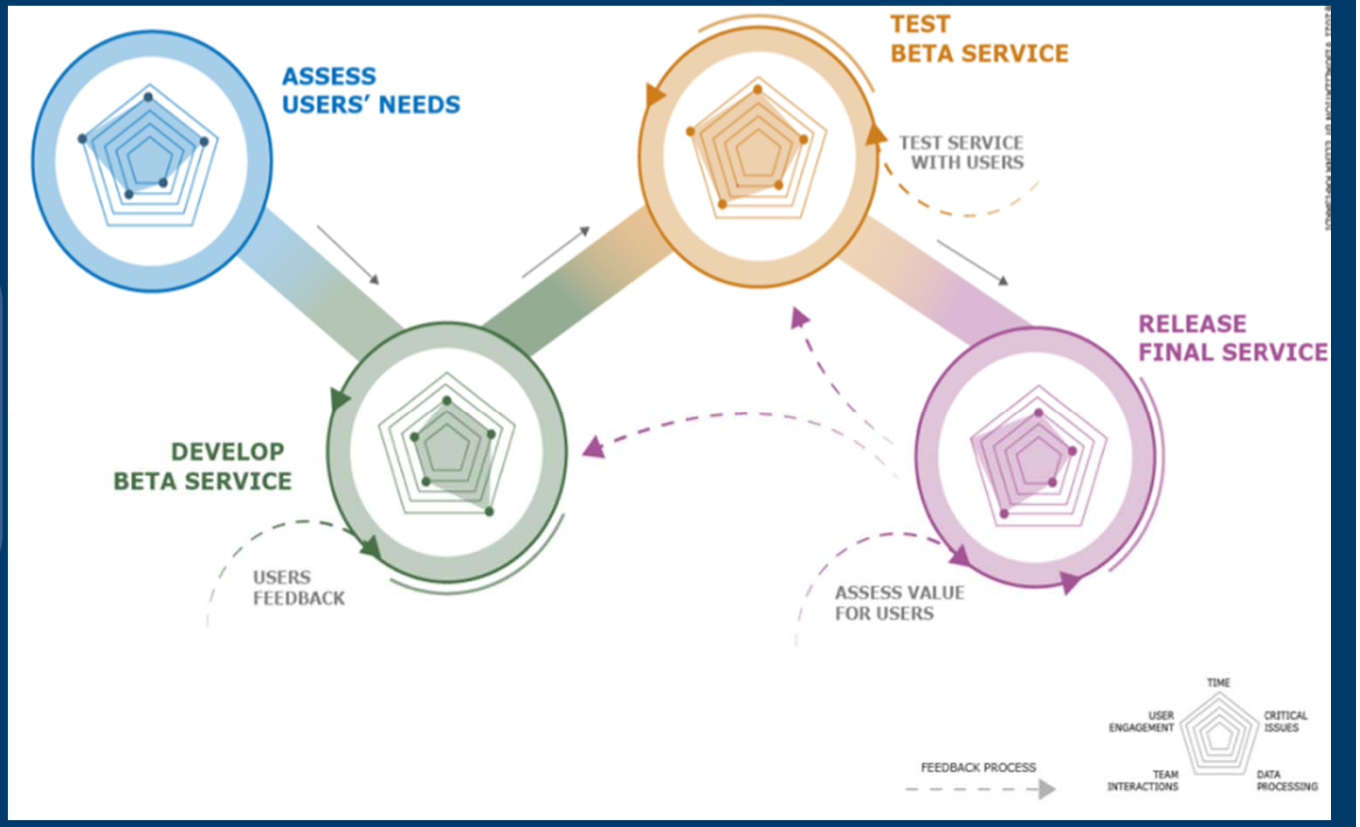
- Sectoral climate services play a key role offering tailored climate information.

Climate services are an interactive and participatory process.



MED-GOLD

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

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 776467.

Coordination

ENEA

Research

JRC, Met Office, National Research Council of Italy, BSC Barcelona Supercomputing Center, ENEA

Academy (EU, UK & Colombia)

University of Thessaly, University of Leeds

SMEs and service providers

HORT@, ec2ce, beetobit, gmv

Agri-food industry

DCOOP, SOGRAPE, Barilla

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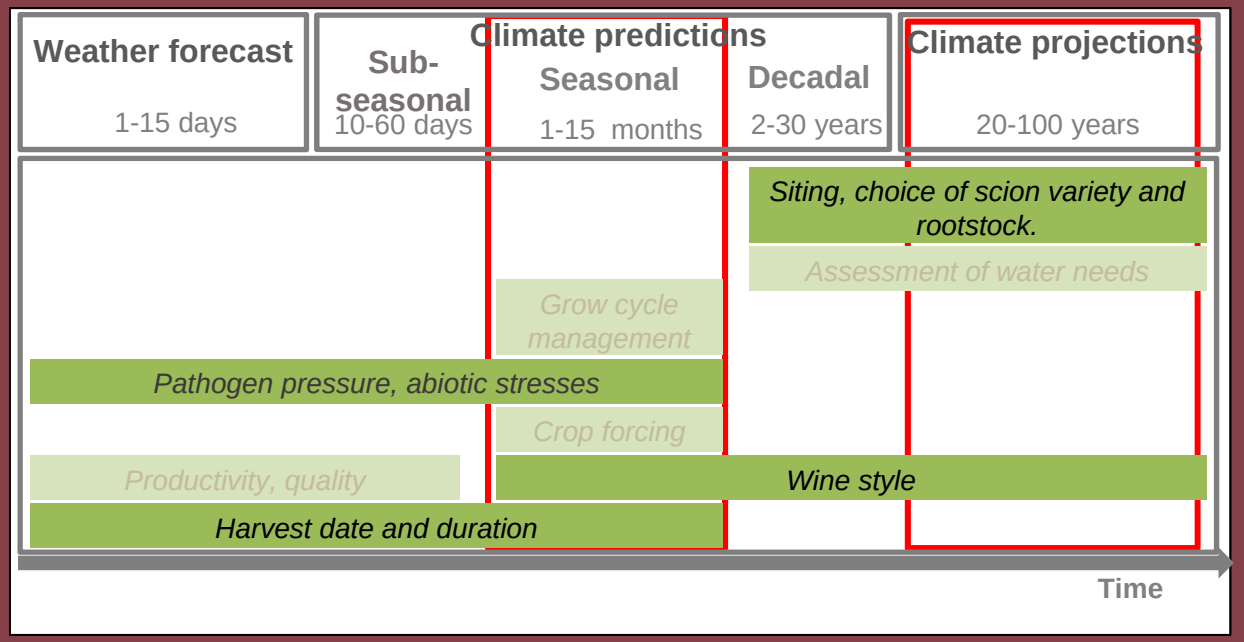
Grape / wine: key actions



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Identification of key bio-climatic indicators

After collecting the key requirements, identifying the key decision, starting working on the trust/value

SprR	**Spring Precipitation**
GST	**Growing Season Temp**
SU35	**Summer days (>35°C)**
HarvestR	**Harvest Precipitation**
WSDI	**Warm spell**

Verification with users

Input from users: **bad** vs **good** years: **1988,1993 2002** vs **2007-2011**

Sources of risks for infestations identified:

1. High/Low **Spring Precip** (if high rainfall risk doubled!)
2. High **Harvest Precip**
3. Low **Growing Season Temp**

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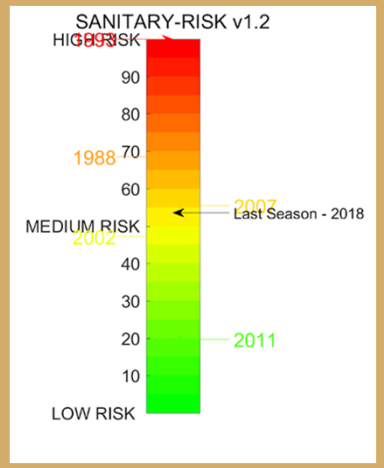
Co-design & co-development of compound risk index

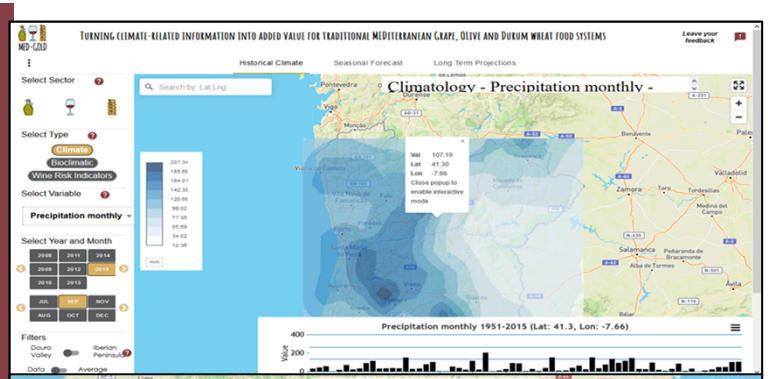


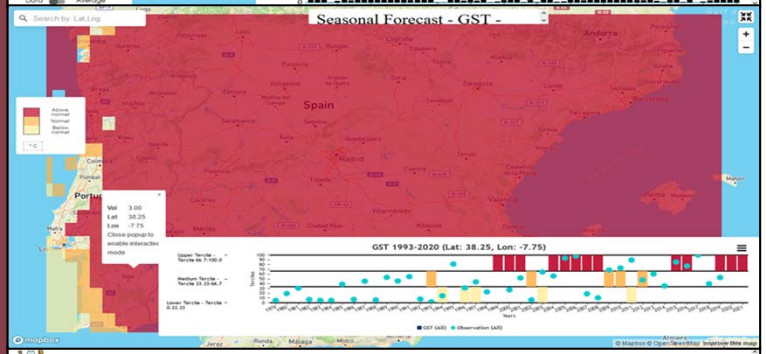
MED-GOLD dashboard
Project users: SOGRAPE, DCOOP, BARILLA

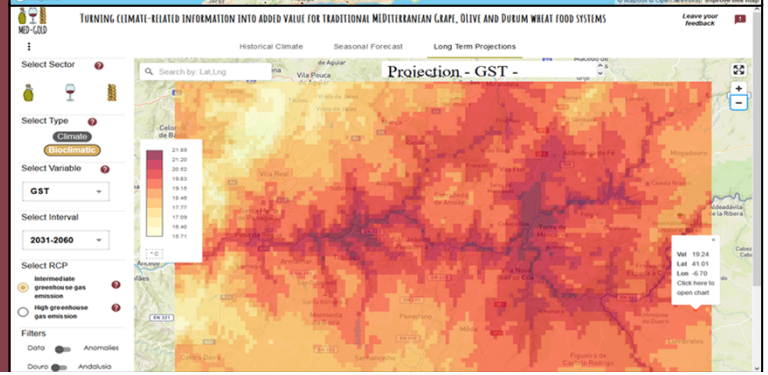
HISTORICAL CLIMATE
Understanding

SEASONAL FORECASTS
Operational planning

LONG-TERM PROJECTIONS
Strategic decision-making







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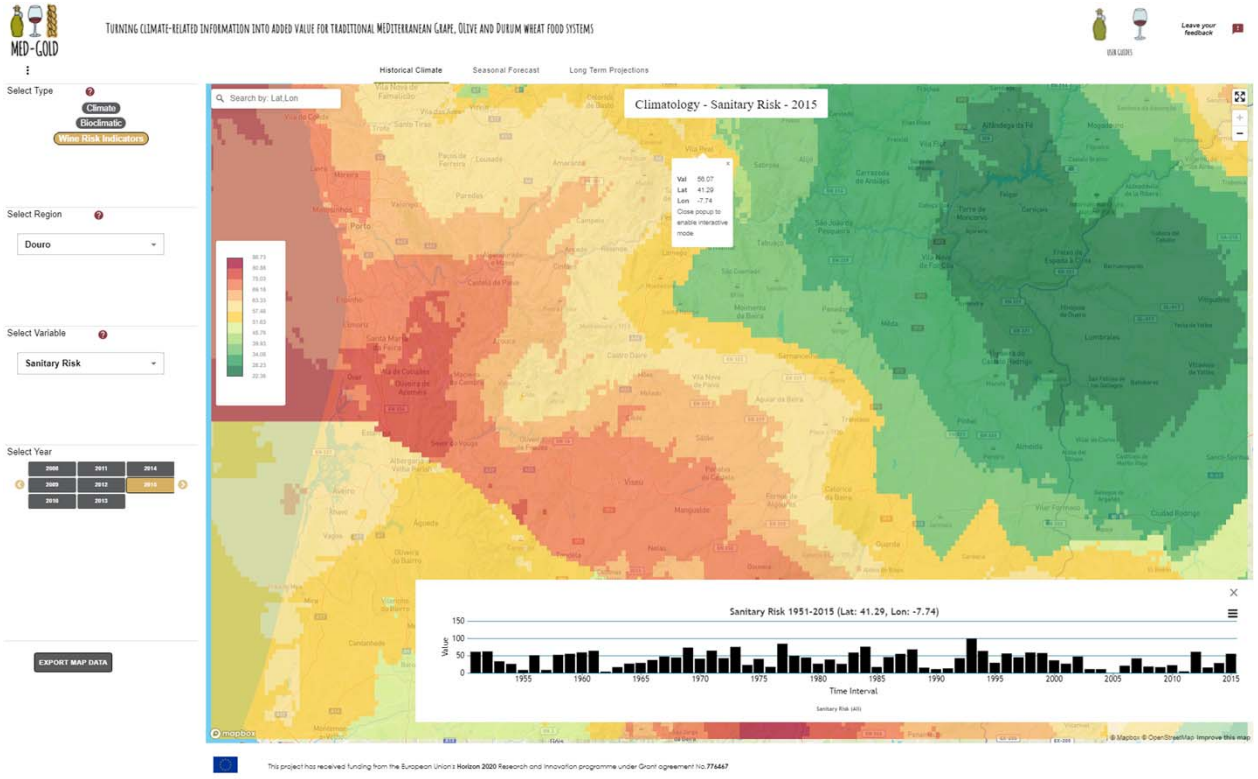
DETAILED HISTORICAL INFORMATION HELPS UNDERSTAND WHAT HAPPENED AND WHY



High-resolution historical evoution for each climate variable indicator and index help explain changes observed in plant phenology, effects of extreme events and consequences over product yields, quality and profitability

SOGRAPE ORIGINAL LEGACY WINES

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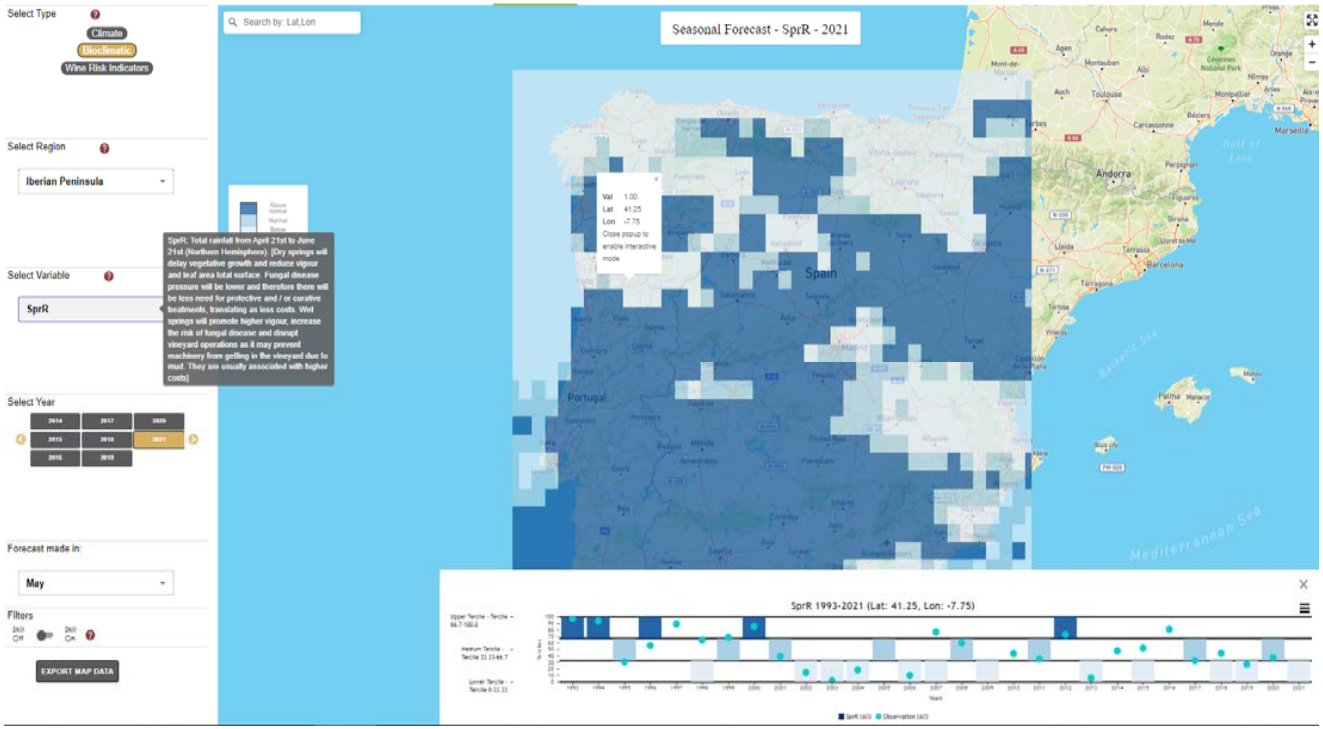
SKILFUL PREDICTIONS PROVIDE UNPRECEDENTED LEVEL OF RISK MANAGEMENT FOR CLIMATE IMPACTS



Seasonal forecasts allow for anticipating high-pest pressure or earlier harvests adjusting expenditure and safeguarding overall profitability.

SOGRAPE ORIGINAL LEGACY WINES

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A COMPLETE PACKAGE OF CLIMATE INFORMATION, ACCESSIBLE, EASY, INTUITIVE AND INTEROPERABLE CREATED BY USERS FOR USERS

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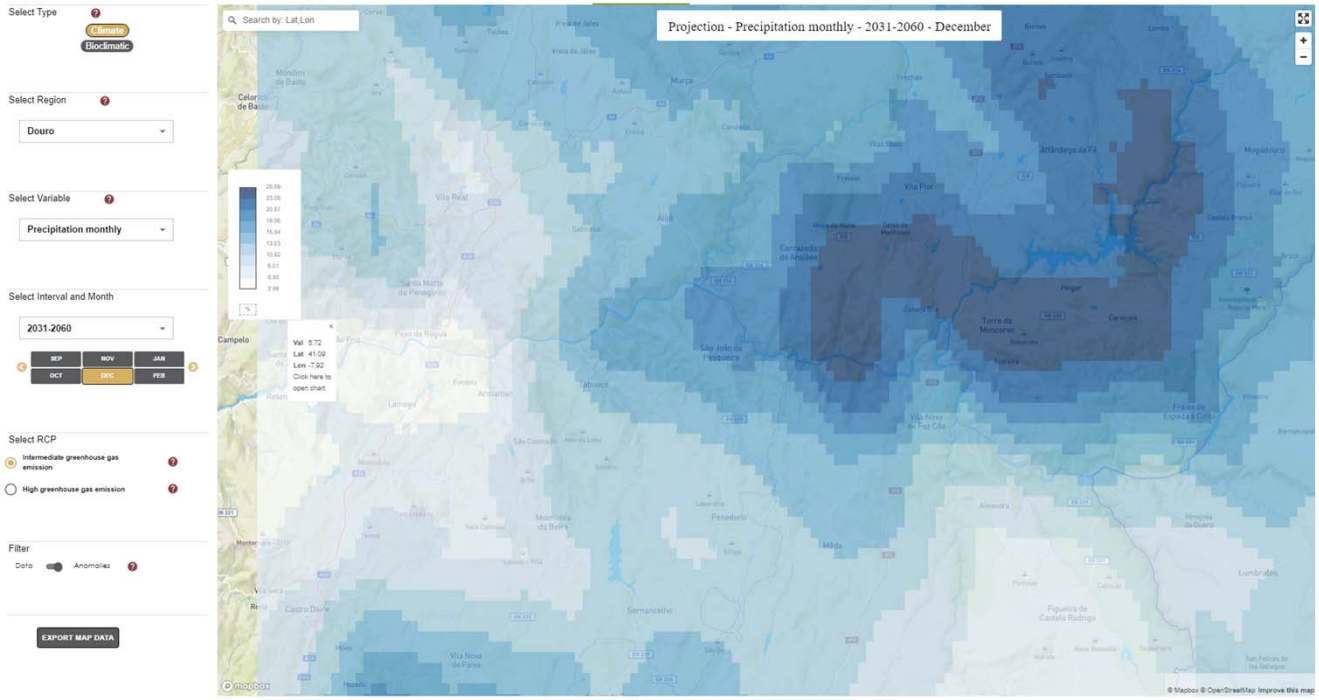

Long-term projections help choose adapted varieties and decide on water availability for viability assessment of sites, supporting the future of investments, business models and policy-making.

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Perspective

- Create operational services

Scale-up

- Replicate to other sectors
- Replicate to other geographical areas

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Thank you for your attention