# *Towards in-season harvest forecasting of olive production in the EU*

*DG AGRI, Civil Dialogue Group on agricultural markets - Olives*

*11 July 2023*

# Outline

1. Overview AGRI4CAST and MARS crop yield forecasting system
2. Need and feasibility to extend the system to olives (2021 workshop outcomes)
3. Proposed extension to olives
4. Main differences between the proposed system and the current system for annual crops
5. Support required from Member States' governments and other stakeholders

# AGRI4CAST objectives

- Provide independent, timely, and accurate information on the growing conditions of crops and quantitative crop yield forecasts for the EU and its neighbourhood
- Provide ad-hoc analysis of extreme weather situations and their impacts on agriculture;
- R&D in agricultural monitoring, data analysis, and modelling, improving the system and researching novel methodologies at the state of art


European Commission

# Policy context

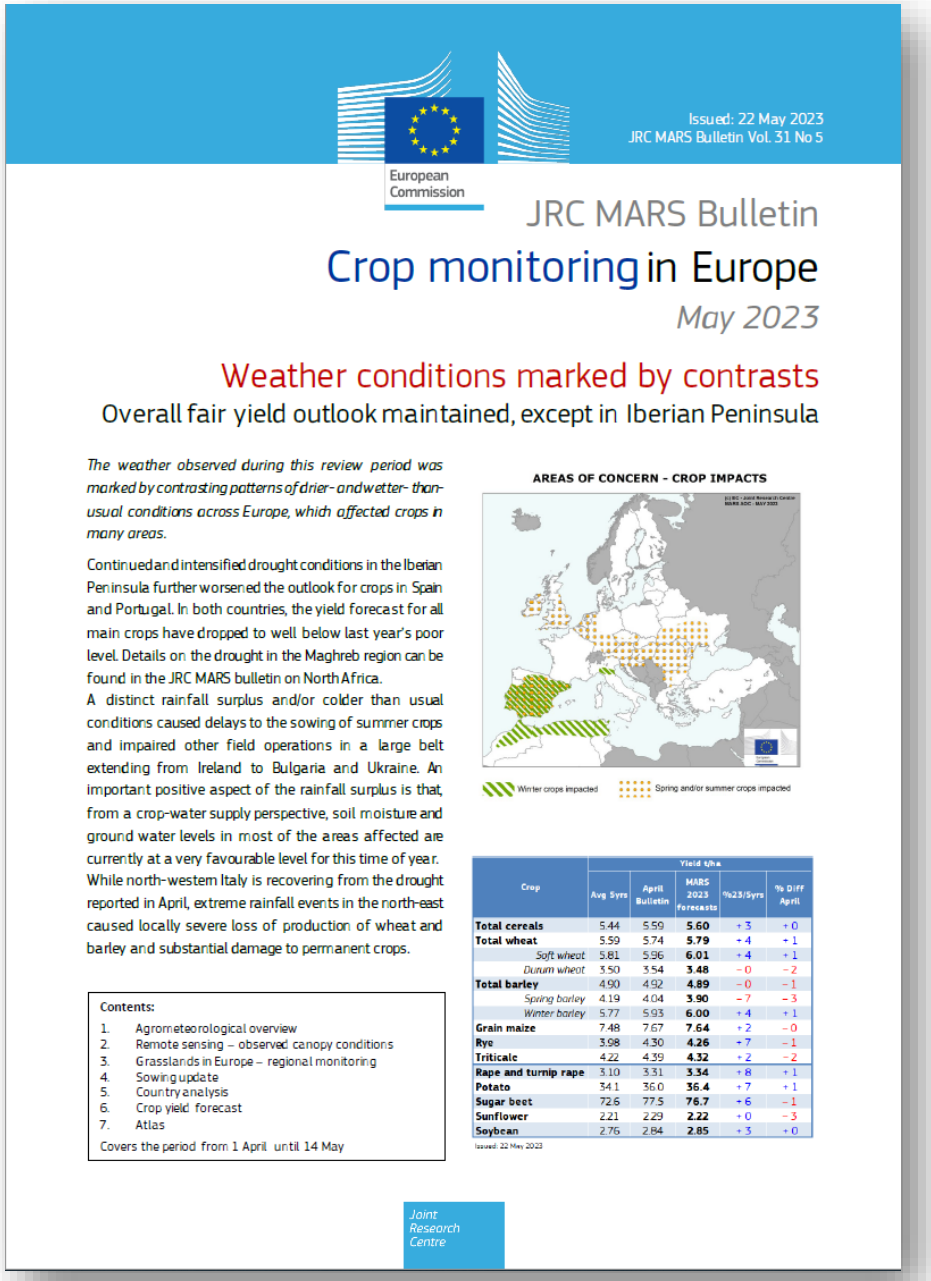
**Common Agricultural Policy**
Art. 25 Reg (EU) 2021/2116 on
"Monitoring Agricultural Resources"

**The European Green Deal**
A healthy food system for people and planet … "to ensure food security in the face of climate change and biodiversity loss"

**Farm to Fork Strategy**
"Contingency plan for ensuring food supply and food security in times of crisis"

# Key Products

1. JRC MARS Bulletin - Crop monitoring in Europe, monthly
2. JRC MARS Bulletin - Crop monitoring European Neighbourhood, 2 times per year
   for 5 regions
3. Ad-hoc analysis, usually concerning impacts of extreme weather events following requests from DG AGRI
4. Up-to-date online information on growing conditions in Europe (MARS Explorer)
5. Scientific publications & technical reports with results from our R&D
6. Datasets and models, also available to the public on our AGRI4CAST Resource portal



European Commission

Issued: 22 May 2023
JRC MARS Bulletin Vol. 31 No 5

JRC MARS Bulletin

Crop monitoring in Europe

*May 2023*

## Weather conditions marked by contrasts

### Overall fair yield outlook maintained, except in Iberian Peninsula

*The weather observed during this review period was marked by contrasting patterns of drier- and wetter- than-usual conditions across Europe, which affected crops in many areas.*

Continued and intensified drought conditions in the Iberian Peninsula further worsened the outlook for crops in Spain and Portugal. In both countries, the yield forecast for all main crops have dropped to well below last year's poor level. Details on the drought in the Maghreb region can be found in the JRC MARS bulletin on North Africa.

A distinct rainfall surplus and/or colder than usual conditions caused delays to the sowing of summer crops and impaired other field operations in a large belt extending from Ireland to Bulgaria and Ukraine. An important positive aspect of the rainfall surplus is that, from a crop-water supply perspective, soil moisture and ground water levels in most of the areas affected are currently at a very favourable level for this time of year.

While north-western Italy is recovering from the drought reported in April, extreme rainfall events in the north-east caused locally severe loss of production of wheat and barley and substantial damage to permanent crops.

AREAS OF CONCERN - CROP IMPACTS

Winter crops impacted  Spring and/or summer crops impacted

Contents:



Covers the period from 1 April until 14 May

| Crop | Yield t/ha | | | | |
|---|---|---|---|---|---|
| | Avg 5yrs | April Bulletin | MARS 2023 Forecasts | %23/5yrs | % Diff April |
| **Total cereals** | 5.44 | 5.59 | **5.60** | +3 | +0 |
| **Total wheat** | 5.59 | 5.74 | **5.79** | +4 | +1 |
| *Soft wheat* | 5.81 | 5.96 | **6.01** | +4 | +1 |
| *Durum wheat* | 3.50 | 3.54 | **3.48** | −0 | −2 |
| **Total barley** | 4.90 | 4.92 | **4.89** | −0 | −1 |
| *Spring barley* | 4.19 | 4.04 | **3.90** | −7 | −3 |
| *Winter barley* | 5.77 | 5.93 | **6.00** | +4 | +1 |
| **Grain maize** | 7.48 | 7.67 | **7.64** | +2 | −0 |
| **Rye** | 3.98 | 4.30 | **4.26** | +7 | −1 |
| **Triticale** | 4.22 | 4.39 | **4.32** | +2 | −2 |
| **Rape and turnip rape** | 3.10 | 3.31 | **3.34** | +8 | +1 |
| **Potato** | 34.1 | 36.0 | **36.4** | +7 | +1 |
| **Sugar beet** | 72.6 | 77.5 | **76.7** | +6 | −1 |
| **Sunflower** | 2.21 | 2.29 | **2.22** | +0 | −3 |
| **Soybean** | 2.76 | 2.84 | **2.85** | +3 | +0 |

Issued: 22 May 2023

Joint Research Centre

# Public uptake

REUTERS

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COMMODITIES NEWS JULY 25, 2022 / 5:24 PM / UPDATED 3 MONTHS AGO

## UPDATE 1-EU monitor cuts 2022 summer crop yields after hot spell

By Reuters Staff 2 MIN READ

(Adds details)

PARIS, July 25 (Reuters) - The European Union's crop monitoring service MARS on Monday cut its yield forecasts for all summer crops, including maize, due to hot and dry weather in many parts of the bloc while making small reductions to its winter grain projection.

Crop prospects in the EU have taken on extra sign
invasion of Ukraine - a major wheat, corn and sunf
ncertainty over Ukr
d sparse rain hurt I
some countries saw

Markt > News > EU-Kommission reduziert Ernteprognose 2023

top + Klimadaten ausschlaggebend

## EU-Kommission reduziert Ernteprognose 2023

Das Agrarmeteorologische Institut der EU-Kommission (MARS) hat die bisherigen Ertragsprognosen zur EU-Ernte 2023 auf der Grundlage von Klimadaten nach unten revidiert.

28.04.2023 von Christian Brüggemann H. Breker, LWK NRW

Los rendimientos esperados para la cosecha europea de cereal caen un 1,4% en sólo un mes

Agronews Castilla y León
24 de junio de 2022

Las perspectivas de rendimiento de los cultivos de invierno de la UE se redujeron ligeramente por tercer mes consecutivo según se desprende del informe de junio de JRC MARS. Así, en el cómputo general de los cereales se muestra un rendimiento medio de 5.500 kilos por hectáreas, lo que supone un 1,4% menos que en el documento de mayo, aunque supera muy ligeramente, en 0,1% la media de los

Menü Artikelsuche agrarheute

Frühjahrsbestellung 2023 in Europa

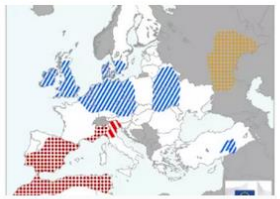
## Europas Bauern mit Aussaat im Rückstand - Regen und Dürre zugleich

© stock.adobe.com/Stefan Thiermayer In weiten Teilen Nordeuropas kam es zu ausgeprägten Regenüberschüssen. In den meisten Regionen war dies der Fall willkommen nach dem trockenen Februar; aber es verursachte erhebliche Verzögerungen bei der Aussaat von Zuckerrüben, Kartoffeln und Sommergerste.

Teilen Twittern Pinnen XING Mail Druck

Dr. Olaf Zinke, agrarheute
am Dienstag, 25.04.2023 - 11:44 (Jetzt kommentieren)

**In Nordeuropa kommen die Bauern nicht auf die Felder, weil es zu feucht ist. In Spanien und Italien ist es extrem trocken. In Deutschland gab es den niederschlagreichsten März seit 22 Jahren. Die Ertragsaussichten sind aber relativ gut, sagt die Crop-Monitoring-Agentur der EU-Kommission.**



In weiten Teilen Europas kam es im März und im April zu erheblichen Niederschlägen, was für die vorteilhaft für die Wiederherstellung der Bodenfeuchte und des Grundwasserspiegels war. Gleichzeitig kam es jedoch zu erheblichen Verzögerungen bei der Aussaat und anderen Feldarbeiten, berichtet die europäische Crop-Monitoring-Agentur MARS in seinem Aprilbericht.

In weiten Teilen Nordeuropas kam es zu ausgeprägten Regenüberschüssen. In den meisten Regionen war der Regen willkommen nach dem trockenen Februar;

© MARS Während es im Nordwesten Europa sehr feucht war, hielten die Dürrebedingungen in Norditalien an und verschärft sich auf der

RÉPUBLIQUE FRANÇAISE
Liberté
Égalité
Fraternité

agreste
La statistique, l'évaluation et la prospective du ministère de l'Agriculture et de la Souveraineté alimentaire

SYNTHÈSES CONJONCTURELLES FÉVRIER 2023 N° 400

GRANDES CULTURES

## En 2022, des récoltes contrastées, entre baisse pour les céréales et hausse pour les oléagineux

**En début de campagne 2022-2023, alors que la production de céréales recule en France et au niveau mondial, les prix mondiaux des céréales sont globalement orientés à la baisse après les fortes hausses du début de l'année 2022. Cette baisse peut s'expliquer par le ralentissement de la demande chinoise, l'amélioration des perspectives d'exportation au départ de la mer Noire et une détente des prix de l'énergie. La production d'oléagineux est en nette hausse en France et dans le monde, contribuant à une certaine décrue des prix. Les prix des céréales et des oléagineux demeurent néanmoins globalement à des niveaux élevés.**

Sources

- Les données françaises de la conjoncture Grandes cultures sont des données annuelles. Les estimations de surface et de rendement sont fournies par les services déconcentrés de la statistique agricole en fonction de l'avancement du calendrier agricole. Elles sont établies à dire d'experts et à partir des premiers résultats des enquêtes objectives sur l'utilisation du territoire et les rendements (interrogation de 13 000 exploitants sur les rendements moyens constatés après récolte).
- Les données européennes de production proviennent de l'organisme statistique européen : www.epp.eurostat.ec.europa.eu, du bulletin MARS édité par la Commission européenne : http://mars.jrc.it/mars/Bulletins-Publications, ou de la Commission Européenne/DG-Agri.
- Les bilans mondiaux sont établis par le Conseil international des céréales et l'USDA : www.igc.org.uk et www.usda.gov/oce/commodity/wasde/index.htm
- Les données de production sur le Canada proviennent de l'institut canadien de statistiques : http://www.statcan.gc.ca/.
- Les cotations mondiales (hors Chicago) ainsi que les bilans français provisoires et prévisionnels sont fournis par FranceAgriMer.
- Les cotations françaises sont reprises de l'hebdomadaire La dépêche/Le petit meunier.

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EU corn outlook worsens

Credit: Adobe Stock

08.25.2022 By Arvin Donley

BRUSSELS, BELGIUM — Projections for the European Union's 2022-23 corn harvest continue to worsen as the EU's Monitoring Agricultural Resources (MARS) unit said in its latest report that yields were expected to fall 16% below the five-year average. The new projection is significantly worse than the 7.8% decline forecast by MARS in July.

"Water and heat stress periods partly coincided with the sensitive flowering stage and grain filling," according to the EU report. "This resulted in irreversibly lost yield potential."

AGRONEGOCIOS

INTERNACIONAL

## La CE estima una cosecha de cereales "excepcionalmente alta" en Rusia en la campaña actual

28 de septiembre 2022

La Comisión Europea prevé que la producción de cereales en la Federación Rusa en la campaña 2022/23 sea excepcionalmente elevada, según una edición especial del "Crop Monitoring" del Boletín MARS/JRC, superando los 133 millones de toneladas.

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**The MARS Crop yield forecasting system**
(for annual crops)

A model and data driven decision support system

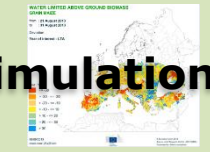
## System design

**Weather monitoring**

*Production of daily meteorological indicators*

**Site and crop specific information to tailor the system to the area/crop of interest**

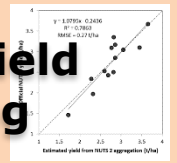
**Crop growth simulation**



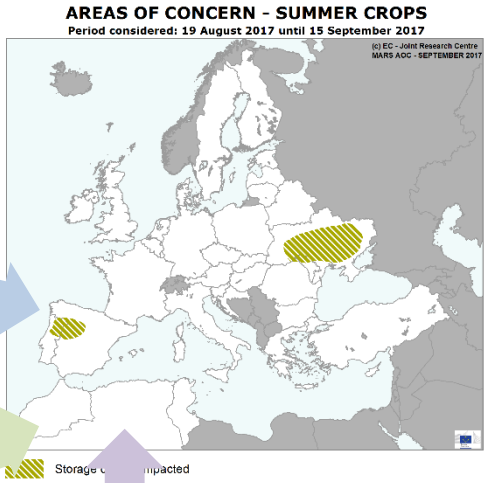
*Production of 10-day biophysical indicators*

**Time series of crop specific area/yield statistics**

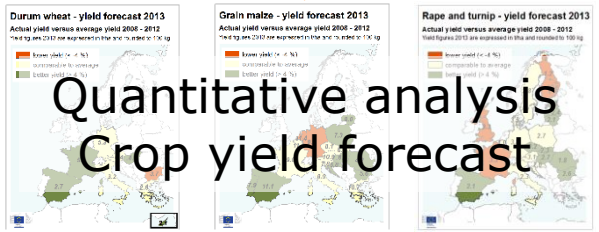
**Statistical yield forecasting**



**Vegetation monitoring Remote sensing**




Analyst is key
System is data demanding
No unique answer




Quantitative analysis
Crop yield forecast

European Commission


# Main workshop outcomes

- Conclusion that expanding the MARS crop yield forecasting system for olives is needed and possible, with adaptations;
- Sketch of improved system;
- Group of leading scientists formed.

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# Proposed MARS Olive Yield Forecasting System

Incoming Solar Radiation

Mean Daily Temperature

Precipitation

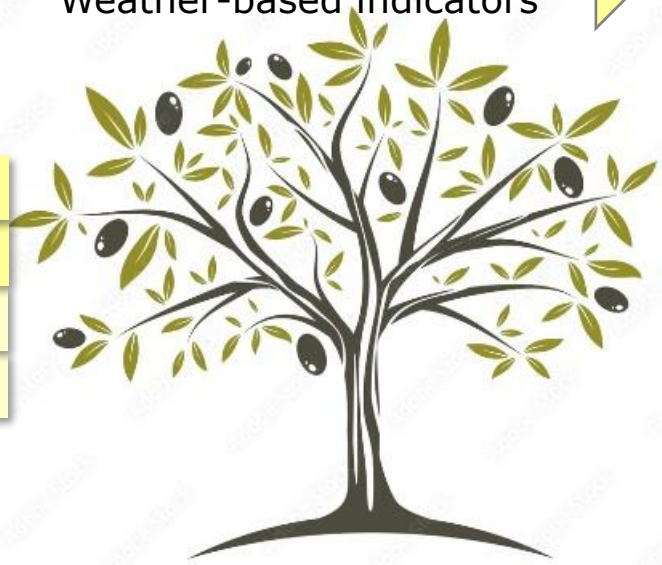
Pollen measurements

**OliveCan+**

Simulated number of flowers,
Number of fruits
Fruit biomass
Weather-based indicators

**Statistical yield forecasting**

Full flowering date
Flower number
Canopy dimensions
Water balance



**OliveCan**

Year t-1 Year t

Flowering

Post-flowering

Final yield
Number of fruits

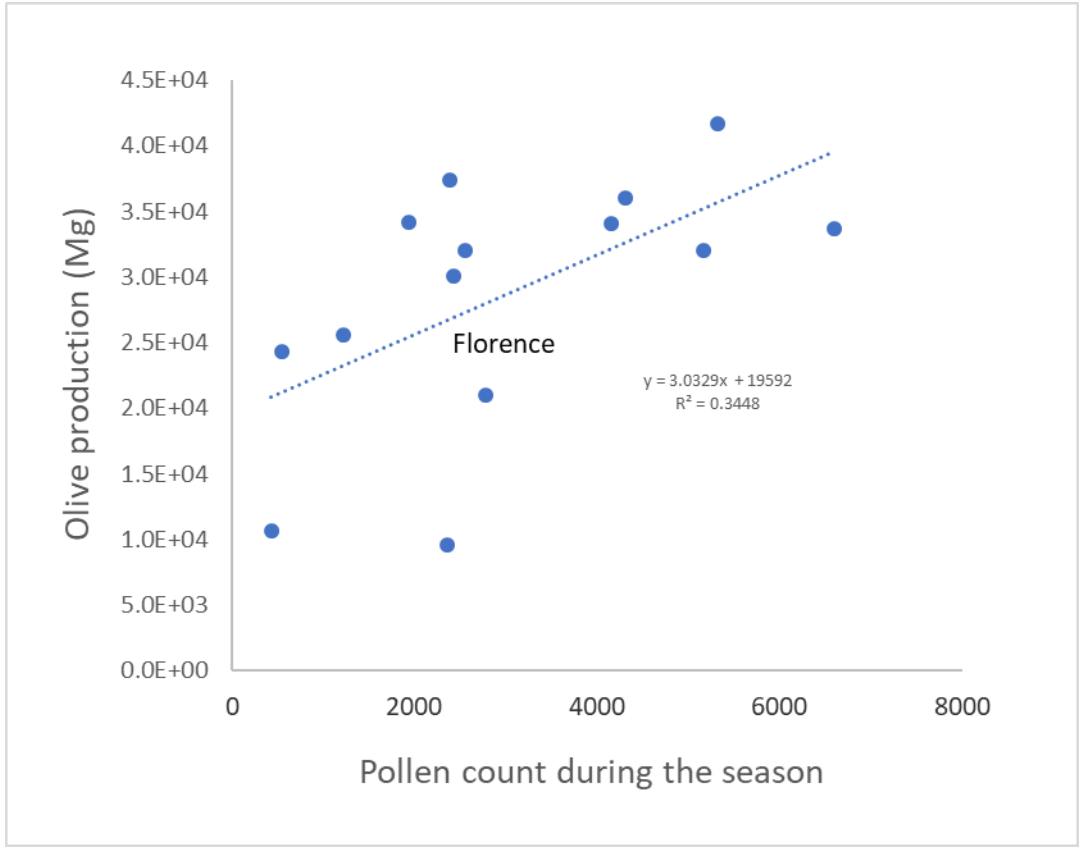
| Nov. | Dec. | January | February | March | April | May | June | July | Agust | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

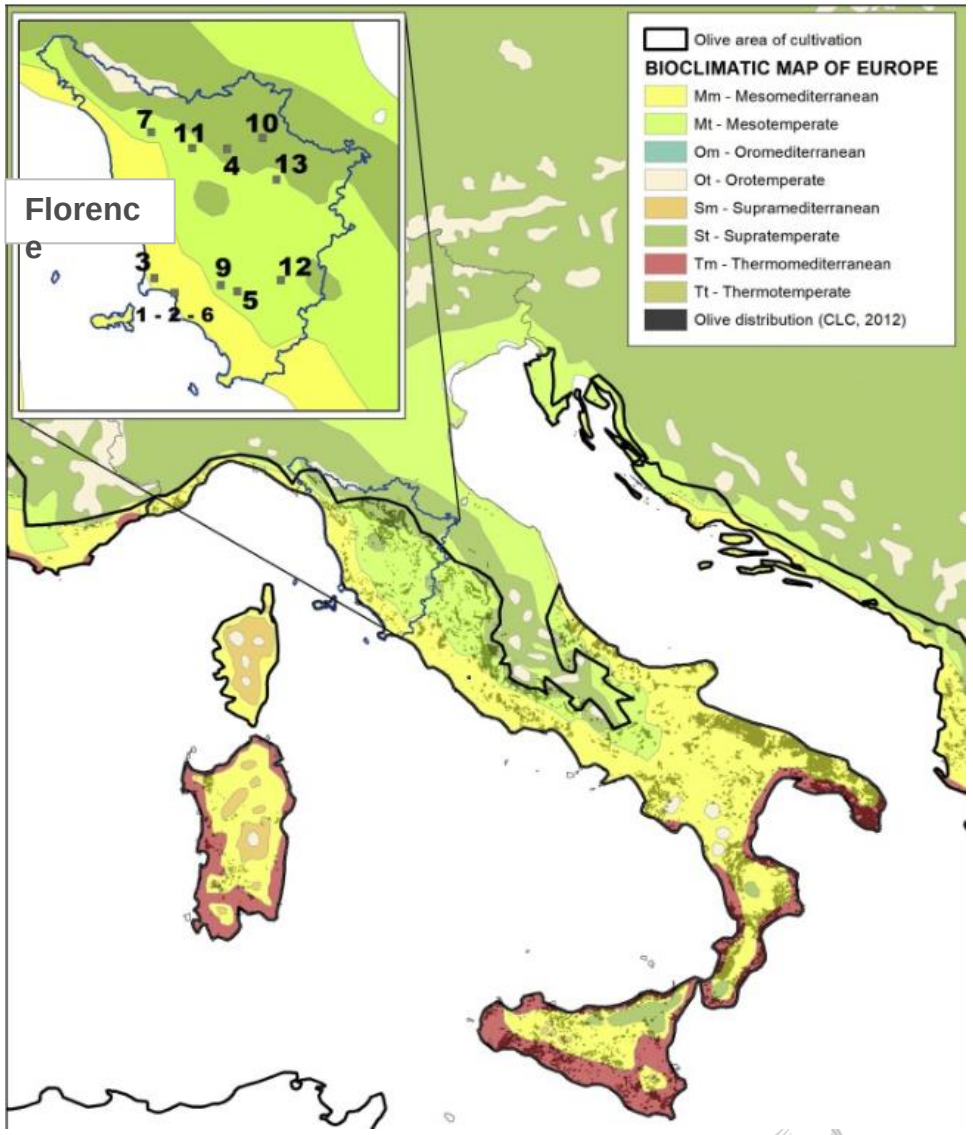
# Main differences with the current system for annual crops

- Introduction of new olive-specific process-based model (simplified OliveCan);
- Use of pollen emission data, at near-real time, to assess “flowering intensity” (and yield potential around flowering)
- Participatory approach (vs more “top-down” approach of current system

**Main stumbling block:** deficiencies in the network of aerobiological stations, required for the timely collection and processing of pollen emission data.

# Why improved aerobiological network is important



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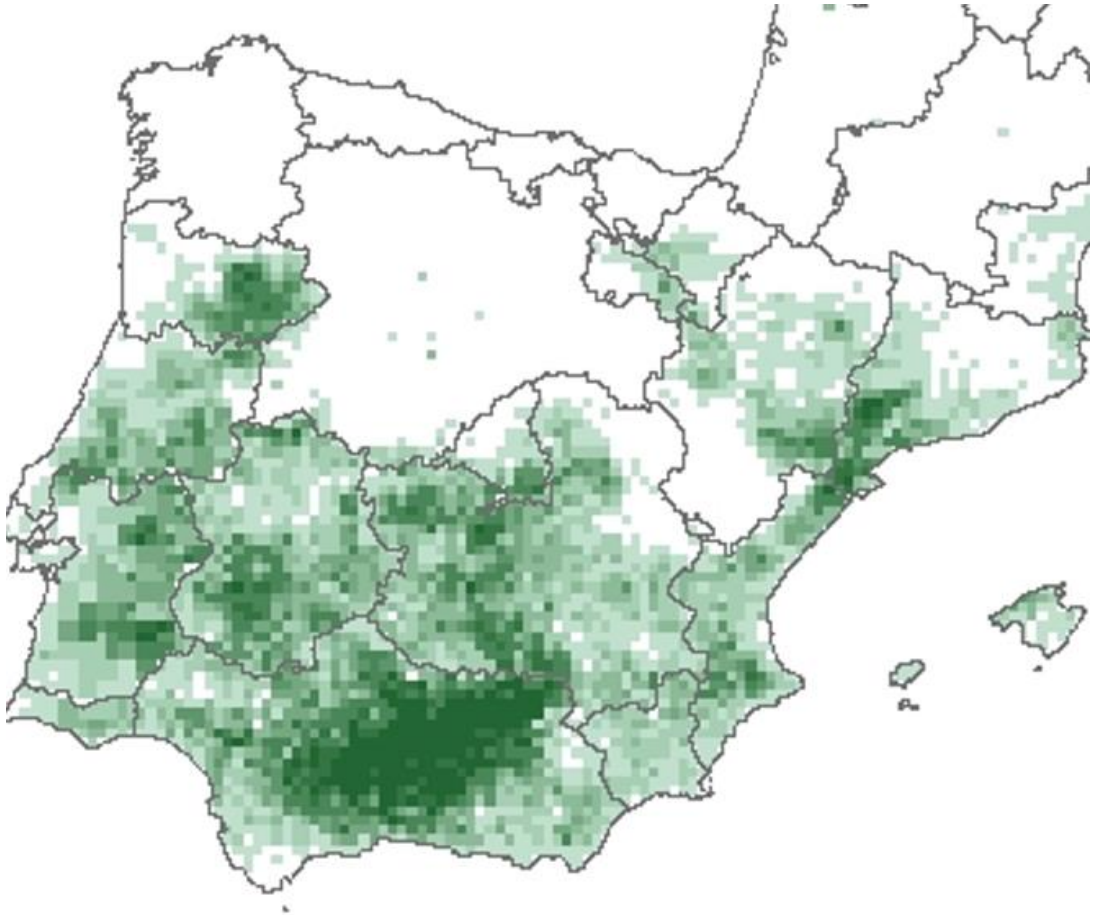
# Aerobiological stations and main olive producing areas in Spain



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# Support required from Member States' governments and other stakeholders

- Facilitate access to information (e.g. data on distribution and characterization of olive orchards, and yield & production statistics at regional level) to help develop and test the system;
- Support to gradually improve and maintain national networks of aerobiological stations; and facilitate "near-real time" access;
- Support to enable contribution of national members of scientific support group, and to participate in "in person" meetings (e.g. once per year);
- Bilateral support (e.g. Italy – Greece) to help with network design and capacity building in countries with very low coverage of aerobiological stations.

# Thank you

Contact: maurits.vandenberg@ec.europa.eu

The JRC MARS Bulletin and other agri4cast resources can be accessed from https://agri4cast.jrc.ec.europa.eu/





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