MED-GOLD POLICY BRIEF:

Sectoral climate services for a sustainable adaptation in agriculture

- MED-GOLD has developed, implemented and tested co-designed climate services to support sustainable adaptation in agriculture
- MED-GOLD services address the need of a broad range of end-users, from farmers to regional, national, and European stakeholders
- MED-GOLD services contribute to enhance climate resilience and offer tools to address the climate ambition of the new Common Agricultural Policy
- MED-GOLD tools are essential to achieve the targets set by the Green Deal, the Farm to Fork Strategy, and the forthcoming Climate Law

The socio-economic challenges posed by climate change require actions and tools for a dynamic sustainable adaptation contributing to the 2050 mitigation targets and the 2030 sustainable development goals. In this context, sectoral climate services play a key role by offering tailored climate information. An effective climate service supports decisions and actions to adapt, reduce the risks, increase resilience, and whenever possible it turns climate change into an opportunity. An effective climate service covers different time scales, from the coming weeks to the coming decades, and addresses the needs of different users acting at the local, national, and regional scales. However, such a climate service did not exist five years ago and the EU-H2020 MED-GOLD project was financed to contribute to filling this gap and develop prototypes for the agricultural sector. MED-GOLD invested in three key agricultural sectors (durum wheat, grape, and olive production) and focused on the Mediterranean region. However, all its prototypes have been developed by ensuring broader applicability to other regions and other sectors. By breaking silos and reaching out to a broader community of end-users (composed of farmers, breeders, regional stakeholders, food companies), MED-GOLD has achieved its challenging goals.

Involved from the very beginning in the design of the services, end-users contributed to defining the specific needs, followed the development of the services by providing continuous feedback, and tested their effectiveness and usability. Each pilot service was co-developed with specific users and with a specific technical team in MED-GOLD by adopting a common methodological approach across the three climate service pilots. Thanks to this co-design approach, the MED-GOLD services address the needs (by providing targeted climate information) of farmers, breeders, regional stakeholders, and national and European policymakers.

MED-GOLD services build on and take advantage of existing initiatives as well as data and infrastructure facilities. The Copernicus Climate Data Store represents a cornerstone of climate services and has offered the possibility to transform existing data into sectoral information through the development and the implementation of a dedicated platform and open-source tools that are freely available. This approach made possible the integration of MED-GOLD services into existing decision supporting systems already in use in hundreds of farms.

The tools developed contribute to decision-making during the agricultural season, as well as to its long-term planning. They provide crop-specific information supporting optimal agro-management decisions and actions from sowing to harvesting. A dynamic, continuous flow of information is provided by integrating observations, as long as they are made available, with seasonal predictions reaching users at any point in the crop season. Crop-specific climate risks deriving from unfavourable conditions and/or extreme events (e.g. drought, heat stress at flowering) are evaluated at any update of the information provided to offer farmers the possibility to act and minimise the

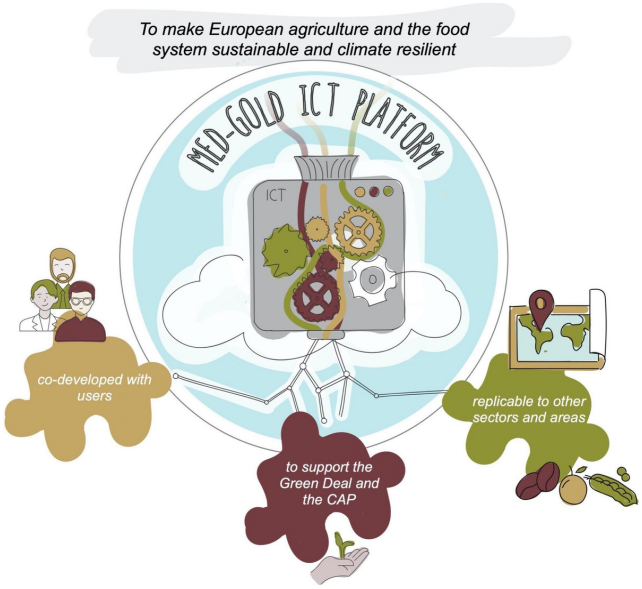

Figure 1 - Schematic representation of MED-GOLD.

impacts. MED-GOLD services do not only aim to get higher and more stable crop yields but also to grow crops sustainably. Key decisions on fertilisation rate, timing, and the number of applications are supported by the information offered. Such support will be crucial to successfully initiate and complete the transition to a sustainable food system as foreseen by the Farm to Fork strategy, e.g. to reduce by 20% the use of fertilisers by 2030. MED-GOLD services also contribute to enhancing the climate performance and resilience of farms, thus addressing the climate ambition of the new Common Agricultural Policy. The services also represent concrete tools that may be used by the Member States to offer voluntary (for farmers) climate and agro-environmental schemes in their Strategic Plans. The co-developed services also support long-term investments (e.g. on infrastructure) to cope with and adapt to climate change, to assist farmers in maintaining their socio-economic well-being and contribution to European competitiveness.

MED-GOLD services support **breeders** in assessing future climate risks, by providing projected conditions under which crop genotypes will be exposed and, thus identifying optimal ones. The services can be also used to test a broad range of ideotypes, sampling different key traits, to better orient current breeding programmes. Looking at the longer time scales, covering the next decades, MED-GOLD offers crop specific evaluation of climate suitability by applying innovative machine learning approaches. Information on changes in suitability support **regional, national, and European stakeholders** in early planning and in developing adequate policy measures to counteract the impacts of climate change, balance the internal market, and in some cases act on adapting the entire supply chain. The offered service on projected crop yield, under different assumptions and scenarios, complements the support to all levels of stakeholders.

The tools developed can also support the **European Commission's** agricultural activities, such as the short and medium-term agricultural outlook. For instance, part of the MED-GOLD durum wheat prototype has been already implemented into the crop yield monitoring and forecasting system of the European Commission Joint Research Centre in support of the short-term agricultural outlook.

The changing climate poses challenges in the decision-making processes of olive growers and olive oil producers too, who need to adapt their irrigation, fertilisation and pesticide application strategies. It also modifies the occurrence of crop diseases, along with their potential damage, and can favour the development of new pests. Thus, anticipating future climate conditions is key for the adaptation of the olive sector, and climate services can help in this process. Furthermore, for wine producers, the changing climate poses new challenges such as in defining long-term strategies, and in viticulture, oenological and stock management. Climate services, particularly predictions of climate variables and bioclimatic indices, can help in these decisions.

To these goals, MED-GOLD creates a visualisation tool, the dashboard, which provides easy-to-use access to information on past climate and predictions of future climate at different time scales. The tool has been co-developed with users to ensure that it addresses their needs and expectations. Anyone can access the dashboard via the MED- GOLD website, or by visiting: https://dashboard.med-gold.eu.

The unique link that has been created (**connecting scientists, practitioners, farmers, stakeholders, and food companies**) within MED-GOLD paves the way to the future synergies that will be needed to address the challenges posed by climate change, ensure food quality, stability, sustainability, and competitiveness. The project has demonstrated the benefits of involving all key actors of the food systems in building services for a climate-resilient and sustainable agricultural sector. These services will be essential to reach the targets set by the Green Deal and the forthcoming Climate Law while contributing to the 2030 Sustainable Development Goals.

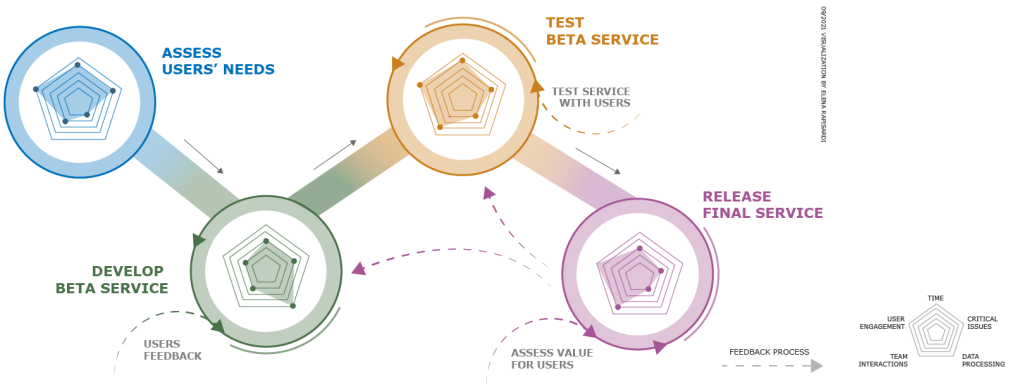

Figure 2 - The co-producing MED-GOLD pilot services approach scheme.

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