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

Deliverable 5.2

Summary of the survey questions, rationale, and dissemination



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TABLE OF CONTENTS

EXECUTIVE SUMMARY	5
1. OBJECTIVES	5
2. IMPACT	5
3. DEFINITIONS	7
4. ACRONYMS	7
5. REFERENCES	7
6. Overall approach to assess the usability of the pilot services	10
6.1. Literature review and Conceptual framework	11
6.2. Survey structure and questions	14
6.3. Survey design and development	16
6.4 Survey dissemination	17
6.5. Survey analysis	18
6.6. Sectoral workshops	18
Annex 1- Survey questions	20
Annex 2: Invitation letter	41
Annex 3: Information sheet	42





LIST OF TABLES AND FIGURES

Table 1-1 project objectives	5
Table 2-1: Expected impacts of the deliverable.....	6
Table 3-1 Definitions	7
Table 4-1 Acronyms	7
Table 5-1 Reference Documents	8
Table 6.1. Number of the Med-Gold community interested in online survey	17
Figure 6.1. Methodology to assess the usability of the Med-Gold climate services.....	11
Figure 6.2: Adapted conceptual framework to assess the usability of the Med-Gold pilot services.....	13
Figure 6.3: Thematic structure and question routing in the Med-Gold survey	15



EXECUTIVE SUMMARY

The Work Package (WP)5 aims to engage with the Med-Gold community to assess and upscale the usability of pilot services developed in WP2-4. The Med-Gold community and beyond was established in Task 5.1 (RD.1). In task 5.2 we engage with the established community to assess the usability of the pilot services. This assessment will be pursued through an online-survey and sectoral workshops. This deliverable is the first step of Task 5.2 which provides a summary of the design process of the online survey questions, rationale and dissemination. The survey has been designed based on an adapted conceptual framework which has been explained in Section 6.1. The conceptual framework is then translated into the survey questions as presented in annex 3.

The survey helps us assess the tools and the results will be presented in Deliverable 5.3. Three sectoral workshops will be held to complement the online-survey. Hence, the results of online survey will be discussed during the workshops to upscale the pilot services. The results of workshops will be presented in deliverable 5.4.

1. OBJECTIVES

With this deliverable, the project has contributed to the achievement of the following objectives (DOA, Part B Table1.1):

Table 1-1 project objectives

No.	Objective	Yes
1	To co-design, co-develop, test, and assess the added value of proof-of-concept climate services for olive, grape, and durum wheat	
2	To refine, validate, and upscale the three pilot services with the wider European and global user communities for olive, grape, and durum wheat	X
3	To ensure replicability of MED-GOLD climate services in other crops/climates (e.g., coffee) and to establish links to policy making globally	
4	To implement a comprehensive communication and commercialization plan for MED-GOLD climate services to enhance market uptake	
5	To build better informed and connected end-user communities for the global olive oil, wine, and pasta food systems and related policy making	

2. IMPACT

The provision of climate services may not necessarily lead to the desired outcome of increased agricultural productivity due to a variety of reasons and obstacles (Vogel et al., 2017). Climate service assessment could help to identify such obstacles and ensure sufficient engagement with end users in the development and dissemination of climate services. The assessment in this project will be done through an online survey and sectoral workshops within Med-Gold community. In doing so, Med-Gold community was established in task



5.1 (RD.1). Thus, a conceptual framework was designed and translated into questions to frame an online survey, the main objectives of which are:

- a) To engage with Med-Gold community regarding the climate services developed in each sector and,
- b) To assess the potential usability of those pilot services.

This deliverable provides a summary of the design process of the online survey, rationale and dissemination which can be a set of criteria to assess the added value of the pilot services developed in Med-Gold project. The result of the assessment shows to what extent the developed climate services can add value to the decision-making process in selected crops.

Table 2-1: Expected impacts of the deliverable

No.	Expected impact	Yes
1	Providing added value for the decision-making process addressed by the project, in terms of effectiveness, value creation, optimised opportunities and minimised risk	X
2	Enhancing the potential for market uptake of climate services demonstrated by addressing the added value	X
3	Ensuring the replicability of the methodological frameworks for value added climate services in potential end-user markets	
4	To implement a comprehensive communication and commercialization plan for MED-GOLD climate services to enhance market uptake	
5	To build better informed and connected end-user communities for the global olive oil, wine, and pasta food systems and related policy making	



3. DEFINITIONS

Concepts and terms used in this document are defined in table 3-1:

Table 3-1 Definitions

Concept / Term	Definition
Climate service	Climate Services involve the (co-)production, transfer, and use of tailored climate information products to improve decision-making at different scales (Vaughan and Dessai, 2014).
Value	The word 'value' has been defined as the range of benefits (economic and/or non-economic) that can be gained from using climate information in decision-making (Bruno Soares et al., 2018).
Usability	Cash et al. (2003) have defined three main criteria for usability which are: credibility, saliency and legitimacy (Lemos 2008; McNie 2007, 2013; Lemos et al., 2012; Lemos et al., 2018; VanderMolen et al, 2020).

4. ACRONYMS

Acronyms used in this document are defined in table 4-1:

Table 4-1 Acronyms

Acronym	Definition
Med-Gold	Referring to the project entitled "Turning climate-related information into added value for traditional MEDiterranean Grape, OLive and Durum wheat food systems"
WP	Work Package
RD	Reference documents
WMO	World Meteorological Organization

5. REFERENCES

The following documents, although not part of this document, amplify or clarify its contents. Reference documents are those not applicable and referenced within this document.



Table 5-1 Reference Documents

Ref.	Title	Code	Version	Date
[RD.1]	Report on the status of the Med-Gold Community			2018
[RD.2]	Broad, K., and S. Agrawala, 2000: The Ethiopia food crisis—Uses and limits of climate forecasts. <i>Science</i> , 289, 1693–1694, https://doi.org/10.1126/science.289.5485.1693 .			2000
[RD.3]	Bruno Soares M, Alexander M, Dessai S (2018) Sectoral use of climate information in Europe: a synoptic overview. <i>Climate Service</i> 9:5–20.			2018
[RD.4]	Cash, D.W., Clark, W.C., Alcock, F., Dickson, N.M., Eckley, N., Guston, D., Jäger, J., Mitchell, R., 2003. Knowledge systems for sustainable development. <i>Proc. Natl. Acad. Sci. U.S.A.</i> 100 (14), 8086–8091.			2003
[RD.5]	Dilling, L., Lemos, M.C., 2011. Creating usable science: opportunities and constraints for climate knowledge use and their implications for science policy. <i>Global Environ. Change</i> 21, 680–689. http://dx.doi.org/10.1016/j.gloenvcha.2010.11.006 .			2011
[RD.6]	Dinku, T., Block, P., Sharoff, J., Hailemariam, K., Osgood, D., del Corral, J., Cousin, R., Thomson, M.C., 2014. Bridging critical gaps in climate services and applications in Africa. <i>Earth Perspect.</i> 1, 15.			2014
[RD.7]	Evely, A. C., I. Fazey, X. Lambin, E. Lambert, S. Allen, and M. Pinard, 2010: Defining and evaluating the impact of cross disciplinary conservation research. <i>Environmental Conservation.</i> , 37, 442–450, doi:10.1017/S0376892910000792 .			2010
[RD.8]	Fazey, I., and Coauthors, 2014: Evaluating knowledge exchange in interdisciplinary and multi-stakeholder research. <i>Global Environ. Change</i> , 25, 204–220, doi:10.1016/j.gloenvcha.2013.12.012 .			2014
[RD.9]	Gettelman, A. Rood, R.B. 2016. <i>Demystifying Climate Models: A Users Guide to Earth System Models</i> . 10.1007/978-3-662-48959-8.			2016
[RD.10]	Hewitt, C.D., Allis, E., Mason, S.J., Muth, M., Pulwarty, R., Shumake-Guillemot, J., Bucher, A., Brunet, M., Fischer, A.M., Hama, A.M., Kolli, R.K., Lucio, F., Ndiaye, O., Tapia, B., 2020. Making society climate-resilient: international progress under the Global Framework for Climate Services. <i>Bull. Am. Meteorol. Soc.</i> 101 (2), E237–E252. https://doi.org/10.1175/BAMS-D-18-0211.1 .			2020
[RD.11]	Jasanoff S, Wynne B (1998) Science and decision-making. In: Rayner S, Malone E (eds) <i>Human choice and climate change</i> (Vol. 1). Battelle Press, Columbus, OH, pp. 1–77.			1998
[RD.12]	Landry, R., M. Lamari, and N. Amara, 2003: The extent and determinants of the utilization of university research in government agencies. <i>Public Adm. Rev.</i> , 63, 192-205. https://doi.org/10.1111/1540-6210.00279 .			



[RD.13]	Lemos, C.L. Kirchhoff, Ch.J. Ramprasad, V. 2012. Narrowing the climate information usability gap. Nature climate change. DOI: 10.1038/NCLIMATE1614.			2010
[RD.14]	Lemos MC .2008.What influences innovation adoption by water managers? Climate information use in Brazil and the United States. JAWRA J Am Water Resour Assoc 44(6):1388–1396.			2008
[RD.15]	Lemos, M. C., K. S. Wolske, L. V. Rasmussen, J. C. Arnott, M. Kalcic, and C. J. Kirchhoff, 2019: The Closer, the Better? Untangling Scientist–Practitioner Engagement, Interaction, and Knowledge Use. Weather. Climate Society., 11, 535–548, https://doi.org/10.1175/WCAS-D-18-0075.1 .			2019
[RD.16]	McNie EC .2007. Reconciling the supply of scientific information with user demands: an analysis of the problem and review of the literature. Environment Science Policy 10(1):17–38. https://doi.org/10.1016/j.envsci.2006.10.004 .			2007
[RD.17]	McNie EC .2013. Delivering climate services: organizational strategies and approaches for producing useful climate-science information. Weather Climate and Society 5(1):14–26.			2013
[RD.18]	Millner, A., and R. Washington, 2011: What determines the perceived value of seasonal climate forecasts? A theoretical analysis. Global Environmental Change, 21, 209–218, https://doi.org/10.1016/j.gloenvcha.2010.08.001 .			2011
[RD.19]	Nelson, R.A., Holzworth, D.P., Hammer, G.L., Hayman, P.T., 2002. Infusing the use of seasonal climate forecasting into crop management practice in North East Australia using discussion support software. Agric. Syst. 74 (3), 393–414.			2002
[RD.20]	Robinson J, Tansey J .2006.Co-production, emergent properties and strong interactive social research: the Georgia Basin Futures Project. Sci Public Policy, 33(2):151–160.			2006
[RD.21]	Tall, A. Coulibaly, J.Y. Diop, M. 2018. Do climate services make a difference? A review of evaluation methodologies and practices to assess the value of climate information services for farmers: Implications for Africa. Climate Services 11: 1–12. https://doi.org/10.1016/j.cliser.2018.06.001 .			2018
[RD.22]	Tall, A., and Njinga, J. 2013. Developing a methodology to evaluate climate services for farmers in Africa and South Asia workshop report. Copenhagen, Denmark: CGIAR Program on Climate Change, Agriculture and Food Security. Retrieved from www.ccafs.cgiar.org .			2013
[RD.23]	VanderMolen, K. Meadow, A.M. Horangic, A. Wall, T.U. 2020. Typologizing Stakeholder Information Use to Better Understand the Impacts of Collaborative Climate Science. Environmental Management 65:178–189 https://doi.org/10.1007/s00267-019-01237-9 .			2020



[RD.24]	Vaughan C, Dessai S .2014. Climate services for society: origins, institutional arrangements, and design elements for an evaluation framework. <i>Wiley Interdisciplinary Review Climate Change</i> 5(5):587–603.			2014
[RD.25]	Vincent, K., Daly, M., Scannell, C., Leathes, B., 2018. What can climate services learn from theory and practice of co-production? <i>Clim. Serv.</i> 12, 48–58.			2018
[RD.26]	Vincent, K., Conway, D., Dougill, A.J. Pardoe, J. Archer, E., Bhave, A.G., Henriksson, R., Mittal, N., Mkwambisi, D., Rouhaud, E., Nhleme, DT. Re-balancing climate services to inform climate-resilient planning – A conceptual framework and illustrations from sub-Saharan Africa. <i>Climate Risk Management</i> 29 (2020) 100242.			2020
[RD.27]	Vogel, J., Letson, D., Herrick, C. 2017. A framework for climate services evaluation and its application to the Caribbean Agrometeorological Initiative. <i>Climate Services</i> , 65–76.			2017
[RD.28]	Weisheimer, A. Palmer, T.N. 2014. On the reliability of seasonal climate forecasts. https://doi.org/10.1098/rsif.2013.1162 .			2014
[RD.29]	WMO (World Meteorological Organization). 2011. Climate knowledge for action: A Global Framework for Climate Services –empowering the most vulnerable. Report of the High-Level Taskforce for the Global Framework for Climate Services (WMO No. 1065). Geneva, 240.			2011

6. OVERALL APPROACH TO ASSESS THE USABILITY OF THE PILOT SERVICES

As mentioned earlier, the main aim of task 5.2 is to assess the usability of the Med-Gold climate services and upscale their usability. This section describes the overall approach adopted to assess the usability of the Med-Gold climate services as illustrated in figure 6. 1. Based on the figure, the assessment starts with a broad literature review which has been used to develop a conceptual framework underpinning this study. The literature review which sets the theoretical foundations for this analysis as well as the conceptual framework to assess the climate services’ usability are explained in Section 6.1. As methodology demonstrates, the framework then is translated to question form and presented as the online survey questions. Survey structure, design and its dissemination have been explained in sections 6.2, 6.3 and 6.4, accordingly. Survey analysis will help us understand gaps in the climate services delivery which will be discussed in sectoral workshops to figure out possible ways to increase their usability.



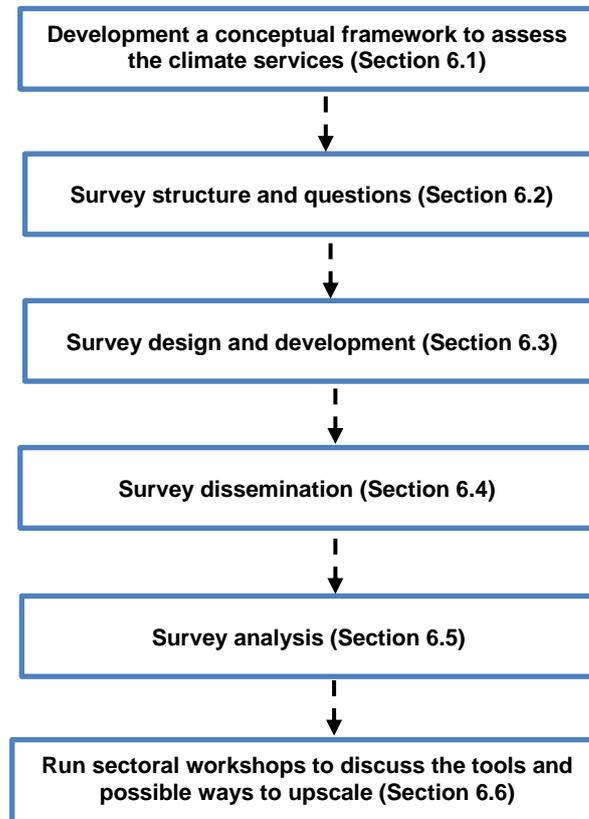


Figure 6.1. Methodology to assess the usability of the Med-Gold climate services.

6.1. LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Scholars use different groups of factors to assess the potential usability of climate information to end-users. Typically, studies assess the usability of climate services based on their accessibility and understandability (Tall and Njinga, 2013; Tall et al., 2018). Hence, significant efforts have led to increasing accessibility and understandability of climate information (Dinku et al., 2014; Hewitt et al., 2020). However, this has not always translated into more effective adaptation (Lemos et al., 2012; Vincent et al., 2018). This means that data availability is not the only requirement of using data in decision-making and usability is beyond availability (Vincent et al., 2020). Vogel et al. (2017) believe some factors such as low-quality of climate information, poor information distribution, inability of farmers to understand the information, and farmer unwillingness could hinder the usability of climate information. The World Meteorological Organisation (WMO) suggest some criteria to define the usability of a climate service such as availability, timeliness, credibility, authenticity, and flexibility (WMO, 2011; Tall et al., 2018). Cash et al. (2003) have streamlined all these factors into three main criteria for usability which are: credibility, saliency and legitimacy (Lemos 2008;



McNie 2007, 2013; Lemos et al., 2012; Lemos et al., 2018; VanderMolen et al, 2020). They are further described below:

Saliency

Saliency requires the information to be relevant to a decision maker's problem (Gettelman, Rood, 2016). For example, information that is timely and informs decision makers about problems that are on their agendas have high saliency and information that arrives at the wrong time in the evolution of an issue (too early, or too late), can fail to influence decision making for lack of saliency (Kingdon 1995; Cash et al., 2003). Hence, in this context, saliency refers to factors such as timeliness of the climate information, spatial scale, appropriate selection of variables, and understandable presentation format (visualisation).

Credibility

Credibility refers to the quality of scientific information as judged by the standards of the scientific community. It relates to aspects of accuracy, reliability and quality of the data (VanderMolen et al., 2020). A high level of trust in the climate information is often associated with a high level of accuracy (Tall et al., 2018). Reliability as trustworthiness of how closely the forecast provided corresponds to observed frequencies (Weisheimer and Palmer, 2014).

Legitimacy

Legitimacy is derived from the process used to produce the information, which must be free from any bias and perceived to be transparent by stakeholders (Cash et al. 2006; Lemos 2008; McNie 2007, 2013). A two-way engagement between users and providers of information, can help building legitimacy and transparency (Jasanoff and Wynne, 1998; Robinson and Tansey, 2006; Vincent et al., 2018; Vincent et al., 2020). Therefore, the legitimacy of providing climate services is predicated on the extent and quality of the stakeholders' involvement in the development of the climate service (Cash et al. 2003; Evely et al. 2010; Fazey et al. 2014; Wall et al., 2017). The role of such engagement in increasing the usability of scientific knowledge has been confirmed by the literature (Lemos et al., 2019).

However, creating useable information, which is salient, credible and legitimate, does not guarantee *per se* the use of the information in decision-making as other factors need to be in place in order to bridge the "usability gap" (Lemos et al., 2012; Vincent et al., 2018; 2020). Such factors include organizational constraints, lack of human resources, or lack of political factors which can hinder application of usable climate information in the decision-making process and adaptation planning (Dilling and Lemos., 2011; Bruno Soares et al. 2018; Lemos et al., 2012). In some cases these external factors are stronger than technical factors e.g. those related to the quality of the climate information (Broad and Agrawala 2000; Millner and Washington 2011; Vaughan & Dessai 2014). Therefore, any climate service evaluation should consider such factors including:



Organisational culture

The organisational culture can both foster or diminish the use of climate information in decision-making (Nelson et al., 2002; Morss et al., 2005; Meinke et al., 2008; Dilling and Lemos, 2011; Lemos et al., 2014). For example, organizations that have decision-making cultures which consider the use of climate information as a strategy to mitigate risk (Lowrey et al., 2009; Rice et al., 2009; Kirchhoff, 2010) are more likely to promote integration of climate information in decision making (Lemos et al., 2014) in comparison to organisations who view it as a risky practice in itself (Broad et al., 2002).

Human capacity

Some scholars have demonstrated that organisations with sufficient in-house human and technical capacity (or those with access to relevant external expertise) are more likely to use climate information (Tang and Dessai, 2012; Bolson and Broad, 2013; Lemos et al., 2014).

Legal framework

Formal requirements and legal frameworks can also influence the adaptation of climate information in use. Many contexts and national laws often force local institutions to integrate climate change issues in their local policies and decision-makings (Oberlack 2017; Simonet and Leseur 2015; Simonet and Leseur 2019).

Therefore, climate services evaluation needs to consider following factors (Figure 6.2.):

- data usability,
- external factors,
- use of climate information,
- and its actual or potential impact/value.

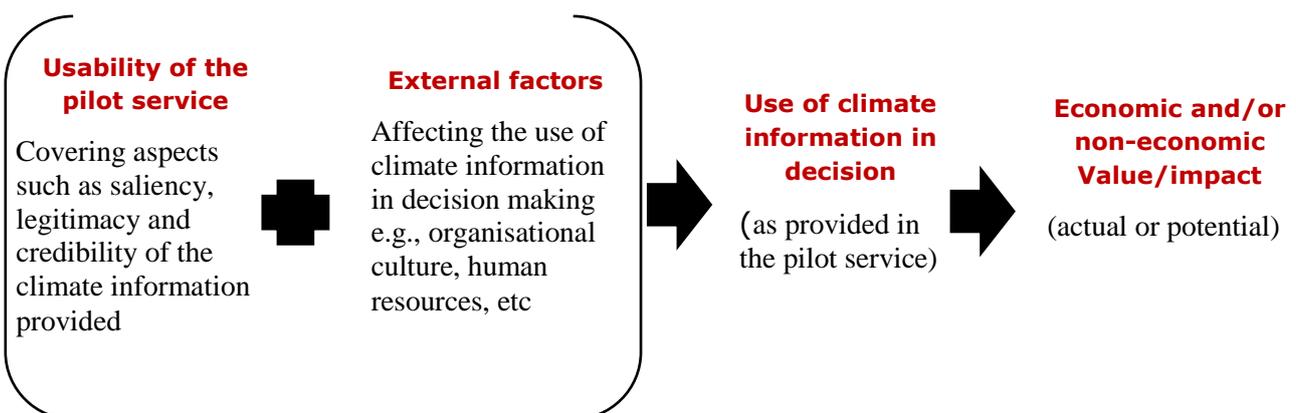


Figure 6.2: Adapted conceptual framework to assess the usability of the Med-Gold pilot services.



6.2. SURVEY STRUCTURE AND QUESTIONS

At this stage, the conceptual framework is translated into questions that shape our survey. The survey is structured in six distinct sections, including:

Welcome page – This section introduces the project, specifies how the data will be used and managed (according to the ethical agreement and data protection laws) and briefly explains how the respondent should navigate through the survey.

Section 1: About you and your organisation – This section captures key details of the organisation, role of the respondent and selection of her/his sector of interest (Olive, Grape or Durum wheat).

Section 2: Tool demonstration – This section will demonstrate the climate service tools which have been developed within Med-Gold project. Three videos have been prepared to demonstrate the content and functionality of climate services developed within Med-Gold.

Section 3: Evaluating the usability of the climate service - This section aims to identify the potential usability of those pilot services in your organisations, and asks you to provide any recommendations on increasing the tool usability in your organisation.

Section 4: Identifying external factors – This final section attempts to identify the external factors that may limit the use of the tool in the organisation and any further comments that the respondent may feel is relevant.

Thank you and the closing of survey – The closing page thanks the participants for their time, reiterates the value of the research and encourages them to forward the link to other colleagues. We also invite participants to take part in our upcoming workshops.

Figure 6.3 below illustrates the thematic structure and routing employed to survey questions.



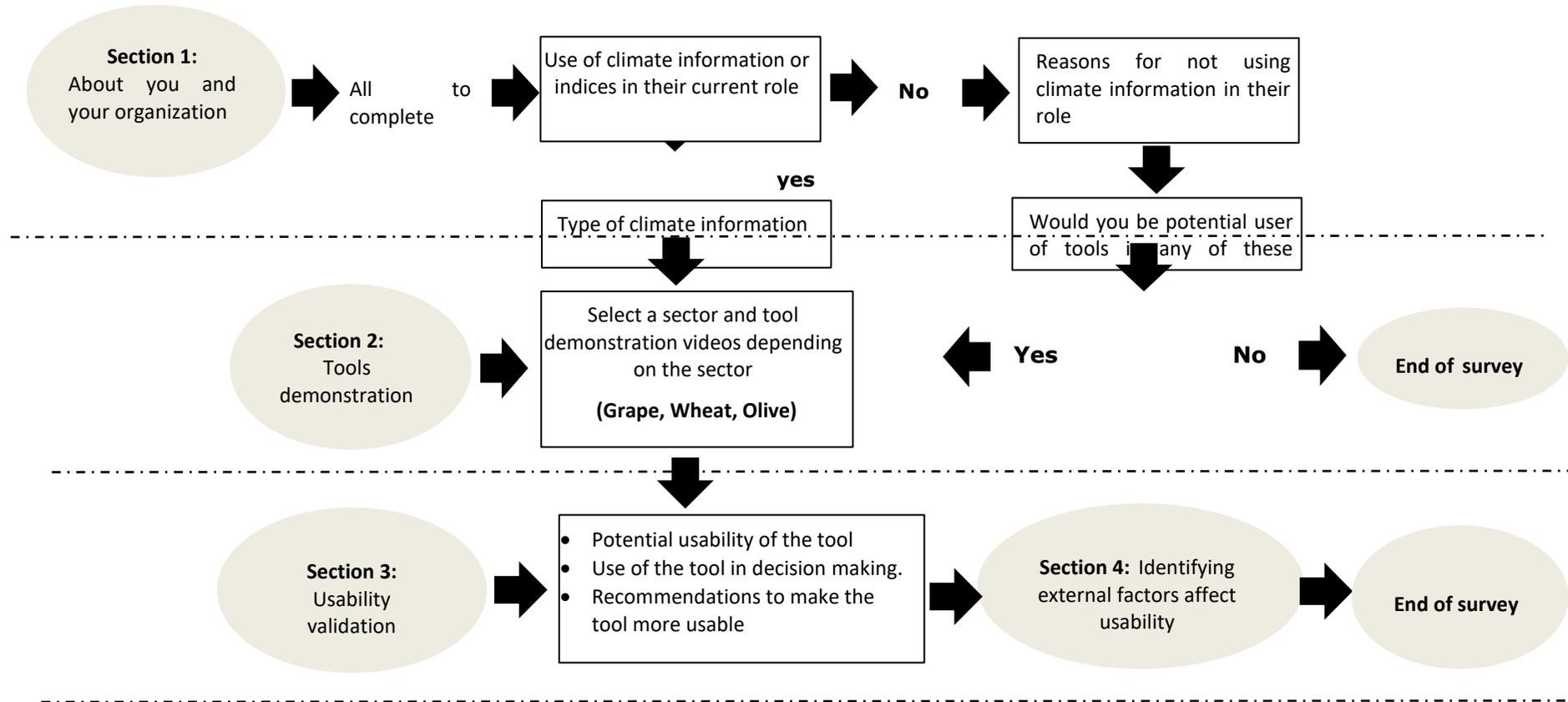


Figure 6.3: Thematic structure and question routing in the Med-Gold survey



6.3. SURVEY DESIGN AND DEVELOPMENT

The final version of the survey will be developed using the software package, Survey Monkey. The survey will be tested in an iterative way through a pilot version with project partners, and other academics based within the Sustainability Research Institute at the University of Leeds. In doing this, a pilot version of the online survey will be launched in April 2021 and the participants will be asked to test the pilot version and provide their feedbacks and comments on how to further refine the survey.

The survey will then be translated by the consortium partners from English into Italian, Spanish, and Portuguese to ensure a wider participation across Europe. These languages were selected as they represent the most common languages spoken in the Med-Gold community. The translated versions of the survey will then be integrated into the software ready for dissemination.

6.3.1. Ethical considerations and data management

There are three main ethical issues raised by the survey:

- data protection, storage and sharing of research data,
- anonymity and confidentiality, and
- informed consent.

The survey is designed and launched via the software 'Survey Monkey'. As per the license agreement with Survey Monkey Ltd, the University of Leeds (as the specified 'data controller') will retain full ownership of survey data and responsibility for the management of this data. The data controller (University of Leeds) mediates how the survey questions and responses are to be used and disclosed to others. Therefore, Survey Monkey can only process survey data in accordance with the client's permissions. All contact information collected about participants during this study will be kept strictly confidential and will be stored separately from the research data.

Participants will be fully informed of the nature of the survey and how the data will be used – this is explained through the information sheet which will be provided to the participants (Annex 3). The online survey is anonymous and thus, all responses will be kept anonymous and confidential. At the end of the survey participants are invited to participate in the sectoral workshops of the research and asked to enter contact details if they wish to do so. This personal information will be detached from the survey response in order to maintain anonymity – this is also explicitly mentioned on the survey itself, so that the respondent can make an informed decision.

A caveat has been added to the closing section of the survey that specifies: "By leaving your details, we assume that you are happy to be contacted by a member of the Med-Gold team to discuss other ways in which you may be involved in the research (e.g. workshops). Your details will be treated with the upmost



respect and will not be passed onto any third parties or used for any other purpose". Therefore, upon entering this information the participant is consenting for these details to be passed to project partners. Where personal information is transferred electronically to project partners, this information will be encrypted to ensure the security of the information. It should be noted that all project partners are located within a European Economic Area and bound by a project agreement to use these details for the specified purpose only.

6.4 SURVEY DISSEMINATION

As mentioned earlier some initials started at early stage of the project to establish the Med-Gold community. The stakeholders joining the community have been offered the possibility of selecting their interest to take part in a range of activities, including:

- Attending online webinars to learn about specific themes of interest to the Med-Gold sectors;
- Receiving periodic bulletins, newsletters, and other communication materials on the latest developments in the climate services being developed in Med-Gold;
- Participating on an online forum that allows them to discuss and ask questions about the climate services developed to the Med-Gold team;
- Participating on an online survey, to help Med-Gold team assess the potential use of the climate services developed within the project;
- Attending participatory workshops, to learn more about the climate services developed, discuss and assess the potential for upscaling and applying the climate services developed in MED-GOLD in other organisations operating in these sectors.

As table 6.1 shows 138 (61.8%) out of 223 individuals of the community are interested in participating in the Med-Gold online survey.

Table 6.1. Number of the Med-Gold community interested in receiving online surveys

Preferred language	Total number in the community	Total number interested in online surveys
English	79	50
Italian	65	41
Spanish	36	21
Portuguese	31	18
Greek	10	8
French	2	0
total	223	138

Although, the Med-Gold community is the starting point of the dissemination, in order to maximise survey responses, different dissemination strategies will be followed such as:



- Med-Gold partners will be asked to circulate the survey to their professional networks and other relevant initiatives. Their organisational newsletters can also help disseminating the survey among their networks. Relevant initiatives and projects could help further this reach among European private-sector businesses that are users of climate services;
- The survey will be added to the Med-Gold website;
- Using the Med-Gold Twitter account to disseminate the survey using relevant and well-known hashtags (e.g. #COP26, #ClimateAdaptation, #climateresilience, #ClimateAction, #ClimateCrisis).

The survey will be launched on 1st of May 2021 and will run for at least two months. The progress of the survey will be monitored at periodic intervals to check the target dissemination activities. Reminders will also be circulated after the first 4 weeks (1st of June) and again after 2 weeks before closing the date. To accompany the survey, we have also produced and translated invitations for participants, which can either be sent as an attachment or pasted into the body of an email (Annex 2). In addition, the project Information sheet (Annex 3) will also be translated and can be sent to prospective participants. Both documents explain the nature of the research, its relevance to the participant and value of participating in terms of informing the provision of climate information/impact indicators available through the pilot services developed in Med-Gold. The English version of these documents is available in Annexes 2 and 3 of this report.

6.5. SURVEY ANALYSIS

As mentioned earlier, we use survey monkey in this research, the results are ready as soon as the survey is closed. The result of the survey will be presented in deliverable 5.3 and help us identify the strengths and weaknesses of the tools. This will be discussed in the sectoral workshops to explore possible ways to upscale their usability in each sector.

6.6. SECTORAL WORKSHOPS

Three sectoral workshops will be pursued in order to complement the online survey. The aim is to present the tools, discuss the results of the online survey and explore and discuss possible ways for upscaling the usability of the pilot services in other organisations operating within the three sectors in Med-Gold. The workshops are expected to be held in the second half of 2021 and the results will be presented in deliverable 5.4. Ideally, these sectoral workshops would be undertaken face-to-face. However, due to the pandemic COVID-19 outbreak, we will seek to pursue these workshops virtually.





7. EXPLOITATION OF RESULTS

In this report, we have adopted a conceptual framework to assess the usability of climate services developed in Med-Gold project with a wider community. This validation could help us understand those constraining factors that may lead to the less use of the developed climate services in practice. This framework could be a basis for validation of climate services or information produced in other projects in agriculture as well as other sectors.



ANNEX 1- SURVEY QUESTIONS

1) Select language to start survey

- English
- Italian
- Spanish
- Portuguese

Aim of survey

The aim of this survey is to engage with the Med-Gold community in Grape/wine, Olive/olive oil, and Wheat/pasta sectors to assess the potential usability of the pilot services developed in each sector.

Completing the survey

The survey takes on average 10 minutes to complete. By completing this survey, you agree that the data collected will be used in our research and results. If you change your mind about participating within two weeks of participation, please inform Dr. Mehri Khosravi (F.khosravi@leeds.ac.uk) and your data will be removed from the study.

Section 1: About you and your organization

2) Please select your organisation's main sector?

- International agency (e.g., UN)
- Government agency
- Sub-national level of government (Local authority or municipality etc.)
- Non-governmental organisation
- Private sector
- Research institute
- Other
- If other, please specify:

3) Which category describes your primary role within your organisation?

- Policy maker
- Researcher
- Climate scientist
- Manager/Director
- Farmer
- Agronomist



- Other

If other, please specify:

4) In which country is your organisation based?

- Italy
- Portugal
- Spain
- Greece
- France
- UK
- Other

If other, please specify:

5) Where does your organisation operate? (Multiple options may be selected)

- Italy
- Portugal
- Spain
- Greece
- France
- UK
- Other

If other, please specify:

Current use of climate information:

6) To what extent is your organisation's activities affected by weather and/or climate variability?

- No impact
- Low impact
- Moderate impact
- High impact
- Very high impact

7) Do you/your organisation currently use weather and/or climate information to run your activities and operations?

- Yes
- No



If yes, please go to Q8 and Q9

If no, please go to Q10 and Q11

8) What type(s) of climate information do you currently use in your role? (Multiple options may be selected)

- Historical climate information
- Weather information (information about weather conditions e.g. hours/days/2 weeks ahead)
- Seasonal forecasts (information about climate conditions 1 to 12 months ahead)
- Climate predictions (information about climate conditions 1 to 9 years ahead)
- Climate projections (information about climate conditions 10 years or more ahead)
- I don't know.

9) What type of climate variables do you currently use in your activities? (Multiple options may be selected)

- Precipitation
- Temperature
- Relative humidity
- Wind speed
- Wind direction
- Frost frequency
- If other, please specify.

10) What are the main reasons for not using climate information in your current role?

- I do not require climate information to perform my current role
- Climate information is difficult to understand
- Climate information is helpful in my role but there is no obligation to use it
- Climate information is helpful in my role but the organisation lacks the in-house expertise to integrate it in our activities.
- Climate information is not available in a format that is useful for my needs
- If other, please specify:

11) Would you consider yourself as a potential user of climate information in any of these sectors?

- a. Yes (please go to Section 2)
- b. No. (end survey)





Section 2: Tools' demonstration

In this section you will be asked to select your sector of interest. Then, you will be able to watch the tool demonstration and be directed to the relevant sector specific questions.

12) Please select your main sector of interest

- Olive and Olive oil
- Grape and wine
- Durum wheat

Video 1) Olive sector

Video 2) Wine sector

Video 3) Wheat sector



Section 3: Assessing the usability of the climate services

3.1. Olive/Olive oil sector

Climate information needs

- 13) What kind of climate information (timescale) do you need to inform key decisions in the olive sector?
(Multiple options may be selected)
- Historical climate information
 - Weather information (information about weather conditions e.g., hours/days/2 weeks ahead)
 - Seasonal forecast (information about climate conditions 1 to 12 months ahead)
 - Decadal predictions (information about climate conditions 1 to 9 years ahead)
 - Climate projections (information about climate conditions 10 years or more ahead)
 - I don't know
- 14) What type(s) of weather/ climate variables do you need to inform key decisions in the olive sector?
(Multiple options may be selected)
- Temperature
 - Rain
 - Relative humidity
 - Wind
 - Solar radiation
 - Soil moisture
 - If other, please specify:
- 15) What kind of bio-climatic indices do you need in your activities in the olive sector? (Multiple options may be selected)
- mean spring (April – May) maximum temperature,
 - Number of spring heat days (threshold: 32 °C),
 - Number of summer heat days (threshold: 36 °C),
 - Number of summer heat days (threshold: 40 °C),
 - Number of consecutive frost days from November to January,
 - Average winter (November-January) minimum temperature,
 - Total annual precipitation,
 - Total precipitation from October to May.
 - Number of dry days from October to May,
 - If other, please specify:



- 16) Please select the reasons for using these types of climate information/indices in your role?
- There is a regulation to use climate information,
 - It is company policy to use climate information and it is considered as a climate change strategy,
 - The use of climate information is necessary for performing my role,
 - It is not necessary to use it in my role, but we use it as it can improve the quality of decision-making.
 - If other, please specify:

The usability of Olivia platform

- 17) Access to the Olivia platform seems easy.
- Strongly agree
 - Agree
 - Neither agree nor disagree
 - Disagree
 - Strongly disagree

Any additional comment?

- 18) Olivia platform map and data format seem easy to understand.
- Strongly agree
 - Agree
 - Neither agree nor disagree
 - Disagree
 - Strongly disagree

Any additional comment?

- 19) Olivia platform has provided the timescales I need in my activities (i.e., weather or seasonal forecasts)?
- Strongly agree
 - Agree
 - Neither agree nor disagree
 - Disagree
 - Strongly disagree

Any additional comment?



20) Olivia platform provides information at the right lead time that I need in my activities and role (e.g., one week ahead of time, 2 weeks ahead of time, etc)

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Any additional comment?

21) Olivia platform addresses the variables I need in my activities and decisions (i.e., temperature, humidity, precipitation).

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Any additional comment?

22) The information provided on Olivia platform seem accurate enough (deterministic forecasts) for me to use in my role and decisions?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Any additional comment?

23) Overall, the information provided by Olivia platform seems reliable (i.e. the information is trustworthy) for me to use it in my decisions.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Any additional comment?



Use of the tool in decision-making

- 24) What kind of decisions do you think Olivia platform could help you with? (You can choose more than one option)
- Pest control
 - Pruning
 - Harvest planning
 - Crop management
 - If other, please specify:
- 25) What potential benefits do you think using Olivia platform could have on the olive sector?
- Better fertilization planning for the season
 - Better pest control (e.g. with anticipating pest outbreaks earlier enough to alert farmers and plant protection suppliers, so necessary treatments can be applied during the early stages of the pest's life cycle)
 - Help plant protection suppliers to plan the amount of plant treatment products to produce in the following season.
 - If other, please specify:
- 26) How would you rate the usability of Olivia platform in supporting your decisions in the olive sector?
- Very usable
 - Usable
 - Neither usable or not usable
 - Not usable

If not usable, could you provide your reasons why it may not be?

- 27) Overall, use of climate information provided in Olivia could add value in my activities and decision-making especially in growing season?
- Strongly agree
 - Agree
 - Neither agree nor disagree
 - Disagree



-
- Strongly disagree

Recommendations:

28) I would use the Olivia platform in the future.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Any additional comment?

29) I would recommend the Olivia platform to others (e.g., technicians, farmers) as it will support my activities and decision-making (e.g., pest treatment and fertilization).

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Any additional comment?

30) What changes would you make to increase the usability of the Olivia platform?



3.2. Grape / Wine Sector

Climate information needs:

- 32) What type of climate information (timescale) do you need to inform key decisions in the wine sector?
- Historical climate information
 - Weather information (information about weather conditions e.g. hours/days/2 weeks ahead)
 - Seasonal forecast (information about climate conditions 1 to 12 months ahead)
 - Climate predictions (information about climate conditions 1 to 9 years ahead)
 - Climate projections (information about climate conditions 10 years or more ahead)
 - I don't know.
- 33) What type(s) of weather and climate variables do you need to inform key decisions in the wine sector? (Multiple options may be selected)
- Temperature,
 - Precipitation,
 - Wind,
 - Solar radiation
 - Relative humidity
 - If other, please specify:
- 34) What kind of climate indices do you use in your activities or role to inform key decisions?
- Growing Season Temperature (GST)
 - Spring Total Precipitation (SprR)
 - Harvest Total Precipitation (HarvestR)
 - Growing Degree Days (GDD)
 - Number of Heat Stress Days (SU35)
 - Warm Spell Duration Index (WSDI)
 - If other, please specify:
- 35) Please select the reasons for using these types of climate information/indices in your role?
- There is a regulation to use this information in my role
 - It is a company policy to use climate information as it is considered as a climate change adaptation strategy.
 - The use of climate information is necessary for performing my role
 - It is not necessary to use it in my role, but it can improve the quality of decision-making.
 - If other, please specify:



The usability of Dashboard

36) Access to Dashboard seems easy.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Any additional comment?

37) It seems easy to understand the map and data on Dashboard?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Any additional comment?

38) The timescales I need in my activities (i.e., weather, seasonal forecasts or climate projections) are available on Dashboard.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Any additional comment?

39) The information on Dashboard addresses the variables that wine sector users need in their activities and decisions.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree



Any additional comment?

40) The information provided seems accurate enough (deterministic forecasts) to use it in decision making.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Any additional comment?

41) Overall, the information provided on Dashboard seems reliable (i.e., the information is trustworthy) to use it in my decisions?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Any additional comment?

Use of the tool in decision-making

42) What kind of decisions do you think Dashboard could help you with? (You can choose more than one option)

- Fertilizing
- Tillage
- Pest control
- Pruning
- Harvest planning and scheduling
- Sowing cover crop
- New vineyard creation
- If other, please specify:

43) Please describe how the information provided by Dashboard could help you in the decisions you selected in the previous question (e.g. which information/indices could help you make which decisions)?



- 44) What potential benefits do you think using Dashboard could have on your activities and decision-making? (Multiple options may be selected).
- Better purchase planning (e.g., it helps me to predict the amount and type of products I need for my vineyard for the following season)
 - Better pest control
 - Benefit through better harvest planning (e.g., it could help me to decide how many workers I need for harvest or determine appropriate time to contract labour and so on)
 - If other, please specify.
- 45) Do you agree that using the climate indices provided in Dashboard can add value in your activities especially during the growing season?
- Strongly agree
 - Agree
 - Neither agree nor disagree
 - Disagree
 - Strongly disagree
- 46) How would you rate the usability of Dashboard in supporting your decisions in the wine sector?
- Very usable
 - Usable
 - Neither usable or not usable
 - Not usable

If not usable, could you provide your reasons why it may not be?

Recommendation:

- 47) I would use Dashboard in the future.
- Strongly agree
 - Agree
 - Neither agree nor disagree
 - Disagree
 - Strongly disagree

Any additional comment?





48) I would recommend Dashboard to others (e.g., technicians, farmers) as it will support my activities and decision-makings (e.g., growing season activities or harvest).

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Any additional comment?

49) What changes would you make to increase the usability of Dashboard?



3.3. Durum wheat/ Pasta Sector

Climate information needs:

- 50) What type of climate information (timescale) do you need in your role or activities?
- Historical climate information
 - Weather information (information about weather conditions e.g. hours/days/2 weeks ahead)
 - Seasonal forecast (information about climate conditions 1 to 12 months ahead)
 - Climate predictions (information about climate conditions 1 to 9 years ahead)
 - Climate projections (information about climate conditions 10 years or more ahead)
 - I don't know.
- 51) What kind of climate indicators do you need in your role or activities?
- Heat stress
 - Cold stress
 - Excessive wetness
 - Hydrological Balance
 - If other, please specify:
- 52) What kind of climate variables you need in your activities to make decisions?
- Temperature
 - Precipitation,
 - Relative humidity,
 - Wind
 - Solar radiation
 - If other, please specify:
- 53) Please select the reasons for using these types of climate information in your role?
- There is a regulation to use this information,
 - It is company policy to use climate information and it is considered as a climate change strategy,
 - The use of climate information is necessary for performing my role,
 - It is not necessary to use it in my role, but it can improve the quality of decision-making.
 - If other, please specify:

The usability of Granoduro.net

- 54) It seems easy for me to access the Granoduro.net.
- Strongly agree



- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Any additional comment?

55) It is easy for me to understand the information provided on Granoduro.net?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Any additional comment?

56) The graphs are easy to understand or interpret?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Any additional comment?

57) Granoduro.net provides the information you need at the right time to support your decision?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Any additional comment?

58) To what extent the Granoduro.net provide information at the right lead-time (e.g. one week ahead of time, 1 month ahead of time, etc) to support your decisions in the wheat sector?

- Low
- Moderate
- High
- Very high



59) The indicators provided by Granoduro.net seem reliable (i.e., the information is trustworthy) for me as a user to help inform my decisions?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Any additional comment?

Use of the tool in decision-making

60) What kind of decisions do you think the new functionality of Granoduro.net could help you with?

(You can choose more than one option)

- Variety choice
- Sowing date
- Soil tillage
- Fertilization
- Weeding
- Crop protection
- Contract and price
- If other, please specify:

61) Please describe how the information provided by Granoduro.net could help you in the decisions you selected in the previous question (e.g., which information/indices could help you make which decisions)?

62) What potential benefits do you think using Granoduro.net could have on your activities and decision-making? (Multiple options may be selected).

- Better disease control (e.g., it can provide me the anticipated information on the risk of wheat diseases during the growing season),
- Better purchase planning (e.g., it helps me to predict the amount and type of products I need for the season)
- Improved efficiency (e.g., using indicators such as hydrological balance and excessive wetness could help me in planning crop management).



- Early indication on grain yield and quality (e.g., indicators such as hydrological balance, rain and extreme temperatures could help me in crop management).
- If other, please specify.

63) Using the climate indicators in Granoduro.net can add value in my activities such as decisions on disease control, fertilization or irrigation?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

64) How would you rate the usability of Granoduro.net in supporting your decisions in the wheat sector?

- Very usable
- Usable
- Neither usable or not usable
- Not usable

If not usable, could you provide your reasons why it may not be?

Recommendation

65) I would use Granoduro.net in the future.

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Any additional comment?

66) I would recommend Granoduro.net to others (e.g., technicians, farmers) as it will support my activities and decision-making (e.g., growing season activities or harvest).

- Strongly agree
- Agree
- Neither agree nor disagree





- Disagree
- Strongly disagree

Any additional comment?

67) What changes would you make to increase the usability of Granoduro.net?



Section 4: Identifying external factors

68) Which of the following factors could hinder use of seasonal forecasts in your role or activities?

(Multiple options may be selected)

- Insufficient legal requirements to uptake seasonal forecasts,
- Insufficient in-house human or technical capacity to use seasonal forecasts or projections in your Organisation,
- Lack of awareness about the benefits of climate forecasts in decision-making,
- Lack of willingness in your organisation to use seasonal forecasts,
- Misconception (lack of trust) of climate information inaccuracy among farmers.

Are there any other external factors that limits or foster use of climate information in your decision-making?

69) please rate the importance of the following factors from 0 (no barrier) to 5 (high).

Factors	No barrier	1	2	3	4	5
Insufficient legal requirements to uptake seasonal forecasts						
Insufficient in-house human or technical capacity to use seasonal forecasts or projections in your Organisation,						
Lack of awareness about the benefits of climate forecasts in decision-making,						
Lack of willingness in your organisation to use seasonal forecasts,						
Misconception (lack of trust) of climate information inaccuracy among farmers.						





Thank you and close of survey

Thank you for taking the time to complete this survey. Your response will help us to improve the climate service tools developed by Med-Gold for the three main crops in Europe.

If you would like to participate in our future workshop, please let us know:

Yes, I would like to participate in future Med-Gold workshop!

If so, please leave your name, and contact details in the box below. Please note that this information will be separated from your response to ensure anonymity. By leaving your details, we assume that you are happy to be contacted by a member of the Med-Gold team to participate in the future Med-Gold workshops. Your details will be treated with the utmost respect and will not be passed onto any third parties or used for any other purpose.

- Name:
- Organisation:
- Email address:
- Contact Number:

Please do remember to **forward the survey link** to your colleagues and any other partner organisations, working within organisations, working within or across the specified sectors, who could benefit from the developed climate services.

Please click SUBMIT to send us your response.





ANNEX 2: INVITATION LETTER

Dear Sir/Madam:

Re: Invitation to participate in research to assess the pilot services developed by the Med-Gold Project.

This project aims to make European agriculture more resilient to climate change by developing climate services for three sectors: grape/wine, olive/olive oil and durum wheat.

As part of Med-Gold, the University of Leeds would like to invite you to complete our online survey. The survey aims to evaluate the potential usability of climate services developed within this project for the 3 main crops in Europe. Therefore, this is an opportunity for you to help improve the services according to your organisation's climate information needs. The survey takes an average of 10 minutes to complete and can be found [HERE](#) (survey link). Further information about the Med-Gold project can be found at <https://www.Med-Gold.eu>. All responses will be kept anonymous and confidential. The survey will be open until 30th June 2021. We would very much appreciate it if you could take the time to complete the survey and help assess and improve the climate services developed within the project.

If you have any questions about the project or the survey, please contact Dr Mehri Khosravi on f.khosravi@leeds.ac.uk.

Thank you in advance for your contribution.

Yours faithfully

University of Leeds, UK

On behalf of the MED-GOLD





ANNEX 3: INFORMATION SHEET

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

You are being invited to take part in Med-Gold which is funded by the European Union's Horizon 2020 research program. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information. Take time to decide whether you wish to take part.

Purpose of this study

Med-Gold is a four-year research and innovation project led by ENEA, the Italian National Agency for New Technologies, Energy, and Sustainable Economic Development, alongside industrial partners, meteorological institutes, universities and research centres, computing centres, and service provider companies from Italy, Spain, Portugal, Greece, United Kingdom, and Colombia. The aim of Med-Gold is to develop climate services specific to agriculture, a sector directly impacted by climate variability and change. In particular, Med-Gold will develop climate services for three traditional sectors of the Mediterranean food system - grapes/wine, olive/olive oil, and durum wheat/pasta – to demonstrate the applicability and benefits of such services within key decision-making processes, minimize climate-driven risks and seize opportunities for these three sectors. More information about the MED-GOLD project can be found at <https://www.Med-Gold.eu>.

Data protection and use

Data protection, storage and sharing of research data has been taken seriously in this research. The survey is designed and launched via the software "Survey Monkey". As per the license agreement with Survey Monkey Ltd, the University of Leeds (as the specified 'data controller') will retain full ownership of survey data and responsibility for the management of this data. The data controller (i.e., University of Leeds) determines how the survey questions and responses are to be used and disclosed to others. All contact information collected about you during this study will be kept strictly confidential and will be stored separately from the research data. We will take steps wherever possible to anonymise the research data so that you will not be identified in any reports or publications. The online survey is anonymous and thus, the data collected will not be traceable to you in the report coming out of this study.

What will this involve?

If you decide to take part in this study, you will be asked to fill in an online survey. The online survey will take approximately 10 minutes to fill in and you will be asked to assess the potential usability of climate services developed within the Med-Gold project.

Why should my Organisation engage with Med-Gold?





Climate is changing and many organisations are vulnerable to these changes. Organisations need to plan for the impacts and opportunities that our changing climate will bring. Having the appropriate tools and climate data to make decisions is essential. In this regard, engagement with Med-Gold will put your organisation in the driving seat to contribute to upscaling the tools which have been developed to adapt to climate change in your sector.

Contact for further information

For further information on this study please contact Dr Mehri Khosravi (F.khosravi@leeds.ac.uk).

Thank you for taking the time to read through the information.

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