



# **GREEN COMPETENCES & SUSTAINABLE PRACTICES FOR WINE SECTOR**

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## MORE INFO AND CONTACT

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## INTRODUCTION

In 2019, the EC European **Green Deal Communication** openly stated that tackling climate and environmental-related challenges is the defining task of this generation. With the goal of transforming the EU economy for a sustainable future, the Green Deal was described as the new growth strategy that aimed to transform the EU into a fair and prosperous society with a modern, resource-efficient, and competitive economy.

Without a workforce to support it, however, an economy based on such sustainable initiatives cannot be achieved. It is important both to prepare the workforce at large for the skill requirements inherent in green jobs and to ensure that wine industries and workplaces do not face a shortage of adequately skilled workers. There is a breadth of skills needed to meet these ambitious objectives. **Proactive reskilling and upskilling** are therefore necessary to reap the benefits of the aforementioned ecological strategy.

The Green Deal communication itself also stressed the necessity of a **European competence framework** which helps to develop and assess knowledge, skills, and attitudes on climate change and sustainable development. Agriculture both contributes to and is affected by climate change.

The EU is **committed to reducing** greenhouse-gas emissions from agriculture and adapting its food-production system. In 2016, agriculture still accounted for 10% of the EU's total greenhouse-gas emissions, consuming approx. 2% of global energy demand, and accounting for 38% of land use, contributing significantly to GHG emissions (FAO (n.d.), FAO et al. (2014), White (2016)).

In this context, the wine sector cannot be left behind. The EU is the **world's leading producer of wine**, accounting for 45% of wine-growing areas, 65% of production, 57% of global consumption, and 70% of exports. It contributes substantially to the agricultural sector, having a major impact on the rural environment and providing employment to millions of people in the EU. The wine sector has thus created

value for local communities and guaranteed the subsistence of populations in vulnerable rural areas with little or no other economic alternative.

This is why **environmental competences** (both knowledge-based and technical in nature) are essential for the wineries workforce and surrounding societies to ensure a positive ecological footprint of the activities carried out in this farming sector that contributes to the ambitious objectives.

This guide is the first output of the Project **Green Vineyards** (Upskilling wineries staff: Responding to the challenges of climate change - 2021-1-ES01-KA220-VET-000033311), funded by the Erasmus+ Programme of the European Union. Green Vineyards is an action aimed at contributing to identifying the environmental competences required by wine sector workers to ensure a positive ecological footprint of the activities carried out in this primary sector industry.

To do so, this guide contains a dedicated competence framework while it identifies and collects the best matching practices from all over Europe.

The main aims of the Green Vineyards Competence Framework are to:

1. **Identify and define the competences** necessary to ensure the sustainability of the activities carried out in this wine sector.
2. **Provide a European reference tool** for policymakers, education and training providers, educational staff, guidance practitioners, employers, public employment services, and learners.
3. **Support efforts at the European, national, regional, and local level to foster lifelong learning** from a sustainable perspective.

## METHODOLOGY

### IDENTIFICATION

The initial phase of the competence framework has been founded on actions such as desk research and individual contacts with several stakeholders that have allowed for the identification of several reference documents, such as the **GreenComp**: the European sustainability competence framework. The GreenComp identifies a set of sustainability competences to feed into education programs in order to help learners develop knowledge, skills, and attitudes that promote ways to think, plan, and act with empathy, responsibility, and care for our planet.

As a consequence of this internal task, the consortium partners have been able to select 15 initial competences, considered the most appropriate for the sector, that have the potential to be ultimately approved and incorporated into the final competence framework.

### VALIDATION

These competences then had to be evaluated and validated by a group of stakeholders through an online questionnaire, wherein the individual responses were elaborated into a group average. In the questionnaire, there were also two open questions, in which respondents were invited to indicate their comments and suggestions about the 15 competences, as well as to provide suggestions about best practices in implementing green competences, if they had any.

The questionnaire has been translated into **six different languages** (English, French, German, Italian, Spanish, and Macedonian) to reach the largest number of relevant people in the sector in their own language, thus facilitating the understanding and fluency of the answers.

Consortium partners distributed the questionnaires to a number of selected stakeholders related to the wine sector by sending them a link to the survey. The survey was available for 45 days, between October and November 2022.

Country	Responses
France	20
Germany	28
Italy	26
North Maced.	16
Spain	82
Other	9
Total	181

Table: 1 Number of respondents by country

As of 30<sup>th</sup> November 2022, 201 answers were received. A debugging process was carried out to eliminate invalid, incomplete, or unidentified answers. Following this process, 181 valid responses were obtained from 181 different stakeholders. All of them answered in the affirmative and consented to the questions concerning data processing and confidentiality of the results.

## SURVEY MAIN FEATURES

Some relevant facts about the survey and the characteristics of the respondents:

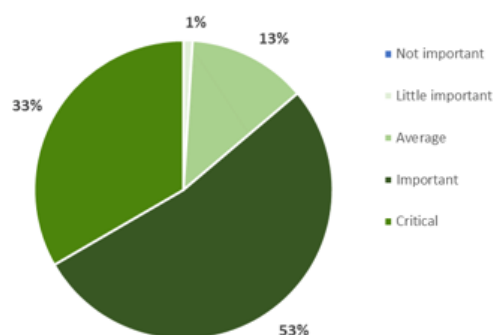
- Regarding the respondents' place of work, 51% of them work in a winery, while 11% work directly in vineyards. Another 18% work in Academia, mainly universities and vocational training centres. The 20% of the answers correspond to the category 'Other', grouping together NGOs, Consultancies, SMEs, and local authorities.

Activity	Responses	%
Winery	92	51%
Farming	20	11%
Academia	32	18%
Other	36	20%
Total	181	

Table: 2 Main sector of activity

- Respondents have an average of 18 years of experience in the sector and rated the importance and impact of climate change in the wine sector at 9 out of 10.

- The combined assessment of the competences made by the respondents to the survey indicates that 86% of the responses marked the competences as 'Critical' or 'Important' for the sector, while just 13% of the responses marked them as 'Average', and only 1% found some of the competences to be of little or no importance.



Graphic 1 Overall scoring

## SURVEY RESULTS

The respondents to the survey had to evaluate and validate the importance of each of the 15 competences on a scale from 1 to 5, where the value 1 was 'Not important' and 5 was 'Critical'. With this numerical conversion, the final score of all 15 competences can be seen in the side image.

Competence	Total
Water management	4,53
Climate change adaptation	4,41
Climate Change Awareness	4,41
Soil Management	4,35
Energy efficiency	4,27
Biodiversity	4,22
Sustainable wine production	4,21
Emissions Reduction	4,18
Waste Management	4,17
Valuing sustainability	4,14
Critical thinking	4,02
Problem framing	4,01
Futures literacy	3,98
Systems thinking	3,98
Local & historical knowledge	3,90
<b>Average</b>	<b>4,18</b>

Table: 3 Score of selected Competences

These results show that 12 competences have been rated between 4 to 5, Important to Critical, while the other three have been rated between 3 to 4, Average to Important, but closer to 4 (over 3.9).

- The competence that achieved the highest score was **Water Management** (4,53).
- The competence with the lowest score was **Local & historical knowledge** (3,90).



If a respondent missed a competence which was not included in the initial list and was deemed necessary because of its relevance, participants were given the opportunity to include it at the end of the survey. Respondents were asked to provide best practices in the implementation of green competences.

## INTERVIEWS

Finally, 25 out of the 181 respondents were interviewed. The main objective of this phase was to validate the information collected through the survey, obtaining more data about specific answers. Interviewees were also asked to elaborate on the proposed best practices.

A comprehensive report on the survey results and interview set broken down by country has been produced, and can be found in [Annex I.](#)



## GREEN VINEYARDS COMPETENCE FRAMEWORK

### Overall knowledge about climate change



#### Climate change awareness

To understand the effects of climate change in the wine sector and viceversa, and to reflect on its impacts and potential consequences for future generations.

#### Climate change adaptation

To take action to prepare for and adjust to both the current effects of climate change and the predicted impacts in the future.

### Environmental management focused on climate change



#### Water management

To make efficient use of the resource, by reducing the water footprint and protecting its quality.

#### Soil management

To support the proper use and management of agricultural soils and implement measures to protect soils, improve their fertility and contribute to the natural sequestration of CO<sub>2</sub>.

#### Waste management

To understand that waste must be sustainably handled and disposed of.

#### Biodiversity

To have a broad understanding of agricultural ecosystems to protect them and build resilience to current and future threats.

#### Emissions reduction

To understand the impact of emissions, while implementing energy-efficient solutions to reduce the carbon footprint.

#### Energy efficiency

To have a broad understanding of energy sources and their impact.

### Wine culture and society from a climate change perspective



#### Local & historical knowledge

To acknowledge the historical importance of wine culture and its benefits for the local environment, society, and the economy.

#### Sustainable production

To identify sustainable wine production practices and implement strategies to achieve it.

### GreenComp competences relevant to the sector



#### Valuing sustainability

To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.

#### Systems thinking

To approach a sustainability problem from all sides; to consider time, space and context in order to understand how elements interact within and between systems.

#### Critical thinking

To assess information and arguments, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.

#### Problem framing

To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time and geographical scope.

#### Futures literacy

To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future.

## GREEN VINEYARDS COMPETENCE DESCRIPTION

The 15 competences have been grouped into four different areas to form the Green Vineyards Competence Framework:





- **Overall knowledge about climate change**
- **Environmental management focused on climate change**
- **Wine culture and society from a climate change perspective**
- **GreenComp competences relevant to the sector**





The EC Council *Recommendation of 22nd May 2018 on key competences for lifelong learning* establishes the definition of competence as the combination of knowledge, skills, and attitudes, where:

- a. **knowledge** is composed of the facts and figures, concepts, ideas, and theories which are already established and support the understanding of a certain area or subject.
- b. **skills** are defined as the ability and capacity to carry out processes and use the existing knowledge to achieve results.
- c. **attitudes** describe the disposition and mindsets to act or react to ideas, persons, or situations.

Therefore, all the competences included in the framework are described as follows:





## I. OVERALL KNOWLEDGE ABOUT CLIMATE CHANGE

Climate change awareness	
 <b>Descriptor</b>	To understand the effects of climate change in the wine sector and viceversa, as well as to reflect on its impacts and potential consequences for future generations.
 <b>Knowledge</b>	<ol style="list-style-type: none"><li>1. Knows the causes, impacts, and potential solutions of climate change in the wine sector.</li><li>2. Knows how climate conditions and weather patterns affect grape growing and wine production.</li></ol>
 <b>Skills</b>	<ol style="list-style-type: none"><li>1. Can identify areas for action in order to reduce the environmental impact.</li><li>2. Can assess the vulnerability of the activities involved in the wine sector caused by climate change.</li></ol>
 <b>Attitudes</b>	<ol style="list-style-type: none"><li>1. Is aware that climate change is occurring and that human activities are contributing to it.</li><li>2. Accepts scientific evidence and is willing to make informed decisions based on this understanding.</li></ol>

Climate change adaptation	
 <b>Descriptor</b>	To take action to prepare for and adjust to both the current effects of climate change and the predicted future impact.
 <b>Knowledge</b>	<ol style="list-style-type: none"><li>1. Knows how sustainable adaptation measures can reduce vulnerability and improve wine quality.</li></ol>
 <b>Skills</b>	<ol style="list-style-type: none"><li>1. Can make informed decisions and take appropriate actions to minimize the negative impacts and maximize the positive impacts of climate change in the wine sector.</li></ol>
 <b>Attitudes</b>	<ol style="list-style-type: none"><li>1. Supports sustainable practices in the wine sector.</li><li>2. Engages in efforts to address climate change through grassroots organizing, lobbying, and direct action.</li></ol>

## II. ENVIRONMENTAL MANAGEMENT FOCUSED ON CLIMATE CHANGE





### Water management

	<b>Descriptor</b>	To make efficient use of the resource, by reducing the water footprint and protecting its quality.
	<b>Knowledge</b>	<ol style="list-style-type: none"> <li>1. Knows how daily activities may have an impact on water availability and quality.</li> <li>2. Knows the impact of water availability and quality on grape growth and wine production.</li> <li>3. Knows water conservation and efficiency practices in vineyards (irrigation methods, reduction of evaporation and evapotranspiration) and cellars (wine production processes).</li> <li>4. Knows the principles of water treatment and reuse.</li> </ol>
	<b>Skills</b>	<ol style="list-style-type: none"> <li>1. Can recognise areas for action to reduce water footprint.</li> <li>2. Can monitor and control water usage in the vineyard and the winery.</li> <li>3. Can identify and address potential water contamination issues of viticulture and wine production.</li> <li>4. Can understand weather patterns and their impact on vineyard water usage.</li> </ol>
	<b>Attitudes</b>	<ol style="list-style-type: none"> <li>1. Is willing to implement sustainable water management practices to reduce the environmental impact on water bodies.</li> <li>2. Is committed to complying with water regulations.</li> </ol>





### Soil management

	<b>Descriptor</b>	To support the proper use and management of agricultural soils and to implement measures to protect soils, improve their fertility and contribute to the natural sequestration of CO <sup>2</sup> .
	<b>Knowledge</b>	<ol style="list-style-type: none"> <li>1. Knows soil types and characteristics (physical, biological and chemical) and plant physiology to manage vineyards efficiently and sustainably.</li> <li>2. Knows soil conservation techniques and climate adaptation measures (inter-row ground cover, sheep grazing, soil tillage reduction, very shallow soil tillage).</li> <li>3. Knows about nutrient and fertilization management.</li> </ol>
	<b>Skills</b>	<ol style="list-style-type: none"> <li>1. Can analyze and interpret soil data to adjust vineyard management accordingly.</li> <li>2. Can use the equipment for sustainable soil management.</li> <li>3. Can optimize soil use in extreme weather events.</li> <li>4. Can increase carbon storage in the soil (organic amendment, temporary or permanent grassing, mulching, or returning vine shoots to the soil).</li> </ol>
	<b>Attitudes</b>	<ol style="list-style-type: none"> <li>1. Recognizes the importance of soil health for producing high-quality grapes.</li> <li>2. Prioritizes sustainable soil management practices (using organic fertilizers and avoiding chemical pesticides) to improve soil fertility (organic soil cover), prevent erosion, and increase carbon storage in the soil.</li> <li>3. Is open to new technologies and innovations in soil management that can improve vineyard productivity and sustainability.</li> </ol>





## Waste management

	<b>Descriptor</b>	To understand that waste must be sustainably handled and disposed of.
	<b>Knowledge</b>	<ol style="list-style-type: none"> <li>1. Knows the different types of waste generated in the winemaking process: (grape growing, harvesting, winemaking, and</li> <li>2. Knows the impacts of waste in the wine sector.</li> <li>3. Knows how to properly handle and correctly dispose of waste correctly (composting, recycling, and repurposing). Reduce, reuse, recycle, recover and dispose of waste.</li> <li>4. Knows the basics of Circular Economy.</li> </ol>
	<b>Skills</b>	<ol style="list-style-type: none"> <li>1. Can implement a waste management plan, including tracking the amount of waste produced, handling and disposal, and evaluating the waste management strategies.</li> <li>2. Can create further value by reusing by-products (vine stocks, branch pruning, wine lees, wastewater, cork, etc.).</li> </ol>
	<b>Attitudes</b>	<ol style="list-style-type: none"> <li>1. Is committed to reducing waste and its impacts.</li> <li>2. Complies with waste management regulations.</li> <li>3. Strives for the eco-design of products and inputs.</li> </ol>





## Biodiversity

	<b>Descriptor</b>	To have a broad understanding of agricultural ecosystems to protect them and build resilience to current and future threats.
	<b>Knowledge</b>	<ol style="list-style-type: none"> <li>1. Knows the importance of biodiversity in maintaining a viticultural ecosystem healthy and resilient to climate change.</li> <li>2. Knows that a specific combination of climate, soil, and other environmental factors contributes to the distinct character and quality of wine in a certain region.</li> <li>3. Knows the potentially harmful impacts of the wine sector on biodiversity.</li> </ol>
	<b>Skills</b>	<ol style="list-style-type: none"> <li>1. Can recognise and select grape varieties accurately to reduce vulnerability (drought-resistant rootstock, late maturing vine varieties, fungal resistant varieties, grape varieties with less water need, etc.).</li> <li>2. Can assess potentially harmful effects on biodiversity of water, air, and soil pollution.</li> <li>3. Can identify and manage pests and diseases.</li> <li>4. Can identify and promote beneficials.</li> </ol>
	<b>Attitudes</b>	<ol style="list-style-type: none"> <li>1. Engages in activities to protect and promote biodiversity in vineyard landscapes.</li> <li>2. Prioritizes biodiversity conservation and sustainable practices (planting cover crops, reducing pesticide use, biocontrol, etc.).</li> <li>3. Complies with biodiversity conservation regulations.</li> </ol>

## Emissions reduction





	<b>Descriptor</b>	To understand the impact of emissions, while implementing energy-efficient solutions to reduce the carbon footprint.
	<b>Knowledge</b>	<ol style="list-style-type: none"> <li>1. Knows the emission sources of the wine sector (grape growing, harvesting, winemaking, and bottling).</li> <li>2. Knows how to reduce the emission of greenhouse gases.</li> </ol>
	<b>Skills</b>	<ol style="list-style-type: none"> <li>1. Can develop and implement an emissions reduction plan (identifying emissions sources, setting goals, and implementing strategies for reducing emissions).</li> <li>2. Can contribute to natural carbon sequestration in soils and biomass.</li> </ol>
	<b>Attitudes</b>	<ol style="list-style-type: none"> <li>1. Is determined to reduce the carbon footprint of their organisation.</li> </ol>





## Energy efficiency

	<b>Descriptor</b>	To have a broad understanding of energy sources and their impact.
	<b>Knowledge</b>	<ol style="list-style-type: none"> <li>1. Knows how to manage the efficient use of energy.</li> <li>2. Knows energy-efficient technologies and practices that are applicable to the wine industry.</li> <li>3. Knows how to assess the efficiency of energy installations in buildings, wineries and farming processes.</li> </ol>
	<b>Skills</b>	<ol style="list-style-type: none"> <li>1. Can monitor and control energy consumption patterns to improve energy efficiency.</li> <li>2. Can assess the efficiency of energy saving plans.</li> <li>3. Can carry out carbon assessments and LCAs.</li> </ol>
	<b>Attitudes</b>	<ol style="list-style-type: none"> <li>1. Is committed to saving energy.</li> <li>2. Promotes the use of renewable energy sources.</li> <li>3. Is open to applying new energy-efficient technologies and equipment (robotics and electrical machinery).</li> <li>4. Prioritises eco-designed buildings.</li> <li>5. Is willing to train and raise awareness of eco-driving.</li> </ol>







### III. WINE CULTURE AND SOCIETY FROM A CLIMATE CHANGE PERSPECTIVE





Local & Historical Knowledge	
 <b>Descriptor</b>	To acknowledge the historical importance of wine culture and its benefits for the local environment, society, and the economy.
 <b>Knowledge</b>	<ol style="list-style-type: none"> <li>1. Knows the history of wine growing and production in a specific region or area.</li> <li>2. Knows the importance of grape varieties and traditional techniques of a specific region or area.</li> <li>3. Knows local and regional wine regulations about wine production and trading in a specific region or area.</li> </ol>
 <b>Skills</b>	<ol style="list-style-type: none"> <li>1. Can analyse and interpret local, national and international market trends and consumer preferences.</li> <li>2. Can apply traditional knowledge for a more sustainable production.</li> </ol>
 <b>Attitudes</b>	<ol style="list-style-type: none"> <li>1. Is willing to continue the legacy of local and historical grapevines (Protected Designation of Origin-PDO, Protected Geographical Indication-PGI, Traditional Speciality Guaranteed-TSG).</li> <li>2. Advocates for the preservation and development of viticultural landscapes.</li> <li>3. Strives to promote the importance of the wine culture to the wider public through sustainable tourism.</li> </ol>

Sustainable Production	
 <b>Descriptor</b>	To identify sustainable wine production practices and implement strategies to achieve it.
 <b>Knowledge</b>	<ol style="list-style-type: none"> <li>1. Knows sustainable grape harvesting methods (e.g., harvest at night/early in the morning to obtain cold grapes).</li> <li>2. Knows the basics of agroecology and agroecological transition, organic and precision methods for grapevines and wine.</li> <li>3. Knows the basics of sustainable wine production (bottling, packaging, labelling transportation, and marketing).</li> </ol>
 <b>Skills</b>	<ol style="list-style-type: none"> <li>1. Can apply sustainable practices in the field and in the winery.</li> <li>2. Can monitor and minimise their environmental impact.</li> <li>3. Can adapt the management of human resources.</li> </ol>
 <b>Attitudes</b>	<ol style="list-style-type: none"> <li>1. Seeks to communicate their sustainability practices to their customers and stakeholders.</li> <li>2. Is committed to a Corporate Social Responsibility (CSR) approach.</li> </ol>







## IV. GREENCOMP COMPETENCES RELEVANT TO THE SECTOR





Critical Thinking	
 <b>Descriptor</b>	To assess information and arguments, identify assumptions, challenge the status quo, and reflect on how personal, social and cultural backgrounds influence thinking and conclusions.
 <b>Knowledge</b>	1. Knows that sustainability claims without robust evidence are often mere communication strategies, also known as 'greenwashing'.
 <b>Skills</b>	1. Can analyse and assess arguments, ideas, actions and scenarios to determine whether they are in line with evidence and values in terms of sustainability. 2. Can look at various sources of evidence and assess their reliability to form opinions about sustainability.
 <b>Attitudes</b>	1. Is curious and inquisitive about the links between the environment, human action, and sustainability. 2. Trusts science even when lacking some of the knowledge required to fully understand scientific claims. 3. Takes an evidence-based perspective and is ready to revise it when new data emerges.

Futures literacy	
 <b>Descriptor</b>	To envision alternative sustainable futures by imagining and developing alternative scenarios and identifying the steps needed to achieve a preferred sustainable future.
 <b>Knowledge</b>	1. Knows the difference between short-, medium- and long-term approaches and their implications for sustainability scenarios. 2. Knows that effects caused by humans play a major role when mapping alternative and preferred future scenarios.
 <b>Skills</b>	1. Can analyse and evaluate futures and their opportunities, limitations and risks. 2. Can identify actions and initiatives that lead to a preferred future.
 <b>Attitudes</b>	1. Is concerned about the impact of one's own actions on the future. 2. Is aware that the projected consequences on themselves and community may influence preferences for certain scenarios above others. 3. Seeks to combine rigorous methods for thinking about the future with creative and participatory approaches.

## Systems thinking

	<b>Descriptor</b>	To approach a sustainability problem from all sides; to consider time, space and context in order to understand how elements interact within and between systems.
	<b>Knowledge</b>	<ol style="list-style-type: none"> <li>1. Knows that every human action has environmental, social, cultural and economic impacts.</li> <li>2. Knows that human action influences outcomes across time and space, leading to positive, neutral or negative results.</li> <li>3. Knows about life cycle thinking and its relevance for sustainable production and consumption.</li> </ol>
	<b>Skills</b>	<ol style="list-style-type: none"> <li>1. Can describe sustainability as a holistic concept that includes environmental, economic, social, and cultural issues.</li> <li>2. Can use life cycle thinking to analyse the risks and benefits of human action.</li> <li>3. Can assess interactions between environmental, economic, social, and cultural aspects of sustainability action, events and crises (e.g., migration caused by climate change or wars caused by resource scarcity).</li> <li>4. Can assess how humans and nature interact across space and time.</li> </ol>
	<b>Attitudes</b>	<ol style="list-style-type: none"> <li>1. Acknowledges the root causes of unsustainability for which humans are responsible, such as climate change.</li> <li>2. Is concerned about the short- and long-term impacts of personal actions on others and the planet.</li> </ol>

## Problem framing

	<b>Descriptor</b>	To formulate current or potential challenges as a sustainability problem in terms of difficulty, people involved, time, and geographical scope, in order to identify suitable approaches to anticipating and preventing problems, as well as to mitigating and adapting to already existing problems.
	<b>Knowledge</b>	<ol style="list-style-type: none"> <li>1. Knows that sustainability to range from relatively simple to complex problems and that establishing their type helps find suitable approaches.</li> </ol>
	<b>Skills</b>	<ol style="list-style-type: none"> <li>1. Can establish a transdisciplinary approach to framing current and potential sustainability challenges.</li> <li>2. Can identify appropriate approaches to mitigate, adapt and potentially solve sustainability problems.</li> </ol>
	<b>Attitudes</b>	<ol style="list-style-type: none"> <li>1. Listens actively and shows empathy when collaborating with others to frame current and potential sustainability challenges.</li> </ol>

Valuing sustainability	
 <b>Descriptor</b>	To reflect on personal values; identify and explain how values vary among people and over time, while critically evaluating how they align with sustainability values.
 <b>Knowledge</b>	<ol style="list-style-type: none"> <li>1. Knows the main views on sustainability: anthropocentrism (human-centric), technocentrism (technological solutions to ecological problems) and ecocentrism (nature-centred), along with how they influence assumptions and arguments.</li> <li>2. Knows that values and principles influence action that can damage, does not harm, restores or regenerates the environment.</li> </ol>
 <b>Skills</b>	<ol style="list-style-type: none"> <li>1. Can evaluate issues and action based on sustainability values and principles.</li> <li>2. Can bring personal choices and action in line with sustainability values and principles.</li> <li>3. Can articulate and negotiate sustainability values, principles and objectives while recognizing different viewpoints.</li> </ol>
 <b>Attitudes</b>	<ol style="list-style-type: none"> <li>1. Is prone to acting in line with values and principles for sustainability.</li> </ol>

## BEST PRACTICES

This section comprises a selection of 22 good practices.

A best practice is defined as a 'working method or set of working methods that is officially accepted as being the best to use in a particular business or industry, usually described formally and in detail' (Cambridge Dictionary)

The selected interventions will help wineries and other final users to benchmark and better understand what is being done on specific topics and will support them in deciding how to structure future upskilling interventions.

Some practices have been identified by the institutions participating in the consortium, based on their own experience and knowledge on the sector, while the rest have been obtained through the 181 responses and 25 interviews conducted with the stakeholders.

## LIST OF IDENTIFIED BEST PRACTICES

### AGROCLIMATIC ATLAS IN THE LOIRE VALLEY



FRANCE

[Further information](#)

### AGROECOLOGICAL TRANSITION AND CLIMATE CHANGE IN VITICULTURE GUIDE



FRANCE

[Further information](#)

### FRENCH PUBLIC SYSTEM OF CERTIFICATION OF HIGH ENVIRONMENTAL VALUE FOR FARMS



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## Agroclimatic Atlas in the Loire Valley

	<b>Location</b>	France
	<b>Competences</b>	Climate change adaptation, Water management, Futures literacy
	<b>Keywords</b>	Agroclimatic Atlas, climate change, 21st century, emblematic grape varieties, Loire Valley, France, temporal spatial forecast
	<b>Description</b>	<p>This tool presents the possible map of the future evolution of agroclimatic indicators associated with the vine. It allows at visualize at the municipal level and on the horizon 2100, the forecasts of the evolution of agroclimatic indicators specific to the emblematic grape varieties of the Loire Valley in France.</p> <p>Calculated on the basis of methodological references published by the scientific community (IPCC) and made available on the DRIAS platform, these maps make it possible to consider the spatiotemporal evolution of the indicators during the 21st Century compared to the reference period.</p>
	<b>Objectives</b>	The objective is to make the user aware of the plausible level of vulnerability of the Loire vineyards in the face of continuing climate change.
	<b>Tools</b>	<a href="https://atlasagroclimatique.techniloire.com/">https://atlasagroclimatique.techniloire.com/</a>
	<b>Additional information</b>	<p>Techniloire is a technical information tool on wine intended for professionals in the Loire sector and managed by InterLoire (<a href="https://www.vinsvaldeloire.fr/fr/interloire">https://www.vinsvaldeloire.fr/fr/interloire</a>), the Loire Valley wine interprofessional organization. It supports professionals in the Loire Valley in improving their knowledge to optimize their technical development and, therefore the competitiveness of their companies.</p> <p>Techniloire aims to be a high-performance monitoring tool, accessible to all professionals and a unique gateway to innovative OADs. <a href="https://techniloire.com/">https://techniloire.com/</a></p>

# Agroecological Transition and Climate Change in Viticulture Guide

	<b>Location</b>	France
	<b>Competences</b>	Climate change awareness, Climate change adaptation, Water management, Soil management, Energy Efficiency, Waste management, Emissions reduction, Biodiversity, Sustainable wine production, Critical thinking, Futures literacy, Systems thinking, Problem framing, Valuing sustainability
	<b>Keywords</b>	Guide, agroecology, transition, climate change, viticulture, France
	<b>Description</b>	<p>The "Agroecological Transition and Climate Change in Viticulture Guide" was developed in 2022 by IFV for winegrowers and professionals in the sector involved in the agroecological transition. It includes "Representation of the agroecological transition in viticulture" and agroecological themes:</p> <ol style="list-style-type: none"> <li>1. Preservation of soil quality</li> <li>2. Preservation and development of biodiversity</li> <li>3. Reduce the use of pesticides and development of biocontrol</li> <li>4. Preservation of water resources</li> <li>5. Use of plant material more adapted to the challenges of agroecology.</li> <li>6. Preservation of air quality &amp; protection of the atmosphere</li> <li>7. Mitigation of the effects of climate change &amp; Adaptation</li> </ol> <p>The corresponding regulatory or possible agri-environmental measures have been created or updated. This guide is a reference document accessible to all, which helps understand the issues and design the future of viticulture. It is also a great tool demonstrating the commitment of French vineyards to environmental transition.</p>
	<b>Objectives</b>	To understand the challenges and practices of agroecology and climate change, to design the viticulture of the future and to demonstrate the commitment of viticulture to environmental transition.
	<b>Tools</b>	<p>The guide includes many examples of tools, services, and applications that are already available.</p> <p>Guide:  <a href="https://www.vignevin.com/wp-content/uploads/2022/02/2-24-02-2022-GuideTAECC-web.pdf">https://www.vignevin.com/wp-content/uploads/2022/02/2-24-02-2022-GuideTAECC-web.pdf</a></p> <p>Previous pedagogic tool for agroecology in viticulture:  <a href="https://www.vignevin.com/outils/outil-pedagogique/">https://www.vignevin.com/outils/outil-pedagogique/</a></p>
	<b>Additional information</b>	<a href="https://www.vignevin.com/">https://www.vignevin.com/</a>



## French Public System of Certification of High Environmental Value for Farms

	<b>Location</b>	France
	<b>Competences</b>	Climate change awareness, Climate change adaptation, Water management, Soil management, Energy Efficiency, Waste management Emissions reduction, Biodiversity, Sustainable wine production, Critical thinking, Futures literacy, Systems thinking, Problem framing, Valuing sustainability.
	<b>Keywords</b>	Agroecology, certification, French public system, environmental value, climate, promotion, indicators
	<b>Description</b>	<p>The High Environmental Value (HVE) is a certification system resulting from the Grenelle de l'Environnement (2007) and supervised by the French public authorities. This certification contributes in a major way to the promotion of the agro-ecological approach, initiated in 2012 by the Ministry of Agriculture.</p> <p>"HVE" is the French public system of environmental valuation and recognition. It is part of a rewarding statement that concerns the entire agricultural operation. It is complementary to other methods of adding value to products that are specific to a sector, a territory, a mode of production or product quality.</p> <p>This certification is a voluntary approach which aims to identify and promote particularly environmentally friendly practices applied by farmers and winegrowers and is built around four environmental themes: the protection of biodiversity, the reduction in the use of phytosanitary products, the management of fertilization and the management of the water resource. It is based on performance obligations measured by environmental performance indicators.</p>
	<b>Objectives</b>	<p>High environmental value (HVE) is a response to a major challenge for agriculture. HVE aims to identify and promote agricultural practices that are more respectful of the environment. Farm certification offers a guarantee that the pressure applied to the environment by farming practices (on air, water, soil, climate, biodiversity, and landscape) is kept to a minimum.</p> <p>The French Government has set quantified objectives in its Biodiversity plan with 15,000 farms certified as High Environmental Value in 2022 and 50,000 in 2030.</p>
	<b>Tools</b>	Biodiversity plan: <a href="https://agriculture.gouv.fr/plan-biodiversite-nous-avons-le-pouvoir-et-le-devoir-dagir">https://agriculture.gouv.fr/plan-biodiversite-nous-avons-le-pouvoir-et-le-devoir-dagir</a>
	<b>Additional information</b>	<a href="https://agriculture.gouv.fr/certification-environnementale-mode-demploi-pour-les-exploitations">https://agriculture.gouv.fr/certification-environnementale-mode-demploi-pour-les-exploitations</a> <a href="https://hve-asso.com/">https://hve-asso.com/</a> <a href="https://agriculture.gouv.fr/les-chiffres-cles-de-la-haute-valeur-environnementale-hve">https://agriculture.gouv.fr/les-chiffres-cles-de-la-haute-valeur-environnementale-hve</a>

## Strategy of the Wine Sector in the face of Climate Change

	<b>Location</b>	France
	<b>Competences</b>	Climate change awareness, Climate change adaptation, Water management, Soil management, Energy Efficiency, Waste management, Emissions reduction, Biodiversity, Sustainable wine production, Critical thinking, Futures literacy, Systems thinking, Problem framing, Valuing sustainability,
	<b>Keywords</b>	Strategy, French wine sector, climate change
	<b>Description</b>	This strategic note for the wine sector presented in 2021, is based on <u>INRAE's Laccave program</u> and the contribution of more than 600 players in the field from all wine-growing areas. It presents 40 priority actions divided into 7 areas. Each area corresponds to one or more objectives, for which actions are given. The implementation of these actions is the target of the roadmap for the Wine sector.
	<b>Objectives</b>	This strategy, drawn up by the entire French wine industry, aims to propose only concrete actions, most of which can be carried out in the short-, and medium-term. This collective work identifies levers quickly mobilized for adaptation and attenuation, which are not always necessarily specific to the viticultural sector.
	<b>Tools</b>	<a href="https://www.vignevin.com/wp-content/uploads/2021/09/Strategie-de-la-filiere-viticole-face-au-changement-climatique_web.pdf">https://www.vignevin.com/wp-content/uploads/2021/09/Strategie-de-la-filiere-viticole-face-au-changement-climatique_web.pdf</a>
	<b>Additional information</b>	<a href="https://www.vignevin.com/article/strategie-de-la-filiere-viticole-face-au-changement-climatique/">https://www.vignevin.com/article/strategie-de-la-filiere-viticole-face-au-changement-climatique/</a>

## Fungus-resistant Grape Varieties

	<b>Location</b>	Germany
	<b>Competences</b>	Biodiversity, Soil management
	<b>Keywords</b>	Fungicides
	<b>Description</b>	<p>Fungal pathogens have so far made the regular use of plant protection products in viticulture almost indispensable - even in organic cultivation. "PIWI Wines" are resistant to important fungal diseases, especially powdery mildew and downy mildew (<i>Erysiphe necator</i>, <i>Plasmopara viticola</i>). They are also often much less susceptible to grey mould (<i>Botrytis cinerea</i>).</p> <p>The use of PIWI Wines leads to fewer fungicide applications. This means fewer fungicides in the environment and on the grapes, along with fewer tractor passes and therefore less energy consumption, less exhaust fumes and less soil compaction.</p>
	<b>Objectives</b>	<p>Ecological advantages:</p> <ul style="list-style-type: none"> <li>• Less energy consumption and CO<sub>2</sub> emissions.</li> <li>• More environmental protection and sustainability by conservation of nature.</li> <li>• Best CO<sub>2</sub> footprint in wine growing.</li> </ul>
	<b>Tools</b>	<a href="https://piwi-international.de/en/">https://piwi-international.de/en/</a>
	<b>Additional information</b>	

## Inter-row Green Cover, Improved Aligned Management

	<b>Location</b>	Germany
	<b>Competences</b>	Soil management, Water management, Climate change adaptation, Biodiversity
	<b>Keywords</b>	Green cover, Soil management, vines, evapotranspiration
	<b>Description</b>	<p>The tramline between the rows of vines can be planted with vegetation (species-rich grassland with legumes). The advantages:</p> <ul style="list-style-type: none"> <li>• Reduction of soil pressure when crossing with a tractor.</li> <li>• Reduction of erosion in case of heavy rainfall.</li> <li>• Contribution to improving soil fertility.</li> <li>• Nitrogen supply to the vines by legumes.</li> </ul> <p>Sensible Management means:</p> <ul style="list-style-type: none"> <li>• Diverse legume-rich greening mixture.</li> <li>• Rolling the green cover (typically, the vegetation is regularly mulched to make the rows easier to drive over and walk on and to reduce competition for water and nutrients. When rolling, the green cover is not mulched but, for example, bent with a knife roller).</li> </ul>
	<b>Objectives</b>	<p>The evapotranspiration of soil moisture can be reduced, and the insect-damaging method of mulching can be replaced:</p> <p>Transpiration from the greenery is reduced. The shading effect of the soil also reduces the evaporation of soil water, meaning that the water can be kept in the area.</p> <p>In the usual process of mulching, the insects are captured by the air current generated by the rotating blades and chopped up by them. This does not happen when the vegetation is rolled. Moreover, insects can still fly to bent flowers and collect nectar and pollen there.</p>
	<b>Tools</b>	<p>Rolling the green cover with a knife roller.</p> <p><a href="https://www.delinat.com/weinlese-blog/die-walze-im-weinberg">https://www.delinat.com/weinlese-blog/die-walze-im-weinberg</a></p>
	<b>Additional information</b>	The soil cover serves as food for the microfauna (tiny soil crawlers and burrowers such as amoebae, nematodes and mites) and microflora (fungi such as mycorrhiza, algae, bacteria and lichens) and is thus the basis for humus formation.

## Organic Viticulture



### Location

Germany



### Competences

Biodiversity, soil management, climate change adaptation, sustainable production, critical thinking, future literacy, system thinking, problem framing, valuing sustainability.



### Keywords

Organic, sustainability, systemic approach, divers green cover, legumes, diversification, risk management



### Description

Organic viticulture is gaining crucial importance in the production of terroir wines. More and more top wineries worldwide have recognised this and are now converting their operations.

In organic viticulture, maximum yields are deliberately avoided. The organic winegrower promotes a self-regulating ecosystem that does without chemical pesticides and easily soluble nitrogen fertilisers.

As in organic farming, it is not the plant that is nourished directly, but the soil life, which in turn nourishes the vine. The aim is therefore to maintain and increase the natural soil fertility of a site. This is based on a positive interaction of soil life, soil substance, humus content, soil structure, soil water balance and plant growth. Greening is one of the essential elements of ecological soil management. Through year-round greening with various legume-rich flowering mixtures, the vintner positively influences the proportion of organic matter in the soil and promotes natural biotic communities.

The basis of plant protection in viticulture is the promotion of plant health and natural self-regulation. Preventing infections begins with the choice of location and includes the selection of rootstocks and varieties that are as resistant as possible.

The diversity of flora and fauna has the advantage that many pests typically no longer occur and need to be controlled.

Less intervention is permitted in the cellar than in conventional winemaking. Organic wines may not be treated with genetically modified yeasts.

Advantages:

- Supporting biodiversity.
- Presumably higher drought stress tolerance.
- Reducing the risk of erosion through green cover and better soil structure.



### Objectives

- Preventive plant protection.
- Regulation of the accompanying vegetation / cover crop.
- Management of green cover.



### Tools










### Additional information

[www.ecovin.de](http://www.ecovin.de)

[www.oekolandbau.de/landwirtschaft/pflanze/spezieller-pflanzenbau/weinbau/](http://www.oekolandbau.de/landwirtschaft/pflanze/spezieller-pflanzenbau/weinbau/)

[www.bkwine.com/features/winemaking-viticulture/organic-viticulture-what-is-it/](http://www.bkwine.com/features/winemaking-viticulture/organic-viticulture-what-is-it/)

## Pheromone Entanglement Traps

	<b>Location</b>	Germany
	<b>Competences</b>	Biodiversity
	<b>Keywords</b>	Biotechnical, environmentally-friendly pest control, berry moth, plant protection
	<b>Description</b>	<p>The female grape berry moth emits a species-specific sexual pheromone to find a mate.</p> <p>Through technically produced female sex pheromones male grape berry moths cannot find the 'pheromone trail' released by females ready to mate and are 'confused'. As a result, mating does not take place and the females cannot lay fertilised eggs, so that no hayworms or sourworms can hatch from them.</p> <p>Through the regular use of this method over the years, the use of insecticides in viticulture has been significantly reduced or avoided altogether.</p>
	<b>Objectives</b>	Technically produced female sex pheromones are filled into specially developed plastic ampoules. These ampoules are hung up once a year before the expected start of flight of the 1st generation (usually at the beginning of April) in a density of 500 pieces per hectare evenly distributed. The fragrances are released evenly and slowly from the ampoules during vegetation.
	<b>Tools</b>	Ampoules with insect-specific technically produced female sex pheromones.
	<b>Additional information</b>	<a href="https://entomology.ca.uky.edu/ef221">https://entomology.ca.uky.edu/ef221</a>

## Vineyard Management with Extensive Sheep Grazing



### Location

Germany



### Competences

Biodiversity, soil management, climate change adaptation



### Keywords

Grass cover management, diversification, risk management, sheep manure, higher land use efficiency



### Description

Sheep can graze the vineyards, in the past especially in winter, but today they also graze during the growing season.

Advantages:

- Dual use of vineyards can provide additional products (wool, meat).
- Manure from sheep can support vital soil life – typical of grazing.
- Cheap clearance of the grape zone (ensuring the quality of the grapes)
- Regulation of the accompanying vegetation makes the use of herbicides as well as some passes (mulching, tilling, understock maintenance with disc ploughs) superfluous.
- Supporting biodiversity.
- Reduction of erosion risk.



### Objectives

- Regulation of the accompanying vegetation / cover crop.
- Clearance of the grape zone.



### Tools

Extensive sheep grazing.



### Additional information

The animals should receive enough mineral feed, otherwise they will start peeling the bark on the trunk.





The sheep can graze without damage from the pea size of the berries until the time when the first berries begin to taste sweet.

Before the sheep are driven in, only fungicides approved for use in vegetable production with short waiting periods should be used. This ensures protection against peronospora and oidium.

<https://www.hs-rottenburg.net/forschung/projekte-schwerpunkte/schafe-im-weinberg/>








<https://www.lw-heute.de/?redid=17759>








## Management of Wastewater and Organic Waste








	<b>Location</b>	North Macedonia
	<b>Competences</b>	Waste management, Water management
	<b>Keywords</b>	Waste, water, management
	<b>Description</b>	<p>Management of organic waste (stems, stalks, remnants of branches and leaves from the new vine) to be able to process and obtain a product which will be reused.</p> <p>In general, all major wineries take actions starting from their vineyards by mulching the branches after pruning, instead of the previous practice of burning them, until obtaining the residues of the stalks, which are then composted and further used as organic nutrition in the vineyards themselves.</p> <p>There is also the installation of purification stations that process the wastewater, and let's not forget that the wastewater from the wineries has a large amount of chemicals in it that are primarily used to wash the equipment.</p>
	<b>Objectives</b>	New method of producing organic waste and installation of purification stations that process the wastewater.
	<b>Tools</b>	Actions for processing and obtaining organic waste and purification stations that process the wastewater.
	<b>Additional information</b>	Tikves winery: <a href="https://tikves.com.mk/en/home/">https://tikves.com.mk/en/home/</a>






## Sustainable Use of Water Resources








	<b>Location</b>	North Macedonia
	<b>Competences</b>	Climate change adaptation, Water management, Soil management
	<b>Keywords</b>	Water management, sustainable use of resources, climate change
	<b>Description</b>	<p>We can conclude that the lack of water is one of the biggest challenges that we are fighting recently.</p> <ol style="list-style-type: none"> <li>1. We have excavated a 3 water wells in order to prevent drying of the grapes.</li> <li>2. Installing systems drop by drop in order to maximise the yield and to intervene directly into the root system.</li> <li>3. By planting more resistant wine varieties, suitable for our climate and soil component.</li> </ol>
	<b>Objectives</b>	Sustainable use of resources during the production of water.
	<b>Tools</b>	Using equipment and installing systems, drilling equipment.
	<b>Additional information</b>	Bovin Winery: <a href="https://bovin.mk/">https://bovin.mk/</a>








Use of Agrovoltatics		
	Location	North Macedonia
	Competences	Climate change adaptation, Energy efficiency
	Keywords	Climate change, energy efficiency
	Description	In a very sunny area, creating shadow is necessary. Instead of nets we propose a usage of photovoltaics (agrovoltatics) placed above the vineyard with a construction to create shadow over a percentage of the vineyard, reducing the sun exposure while generating electricity.
	Objectives	Smart ways to create shadow from photovoltaics to protect the grapes.
	Tools	Usage of photovoltaics (agrovoltatics) to create shadow.
	Additional information	Popova Kula winery: <a href="https://popovakula.com.mk/">https://popovakula.com.mk/</a>

Castello Monte Vibiano		
	Location	Italy
	Competences	Climate change adaption, soil management, energy efficiency, waste management, emission reduction, biodiversity, local & historical knowledge, sustainable wine production, futures literacy, problem framing, valuing sustainability.
	Keywords	Biodiversity, No emission, transparency, responsibility
	Description	The Monte Vibiano castle stands at the centre of the Fasola estate on the Perugia's hills. The farm produces high-quality oil and wine. In 2009, it was awarded "zero CO2 emissions" certification (DNV UNI ISO 14064). It was the first Italian company to do so. The agricultural surface area used is about 40 percent of the total, while more than 30 percent is dedicated to plants and ecological areas. To be more and more sustainable from the farm's point of view, even the packaging materials have been revised, and only electric vehicles and bicycles are used within the estate. The farm also offers tasting services and bicycle tours to pass on its values to citizens.
	Objectives	The company aims to increase the environmental sustainability of wine and oil production. It also offers various initiatives to involve the consumers and convey to them the values of protecting the land and the environment itself.
	Tools	<p>The company offers Its products in two modalities:</p> <ul style="list-style-type: none"> <li>• On-site tasting</li> <li>• On-line store</li> </ul> <p>In addition to this, it is possible to visit the estate using the company's electric cars or via bicycle routes with guides provided by the company itself. In addition, visitors may also experience grape harvesting and olive picking.</p>
	Additional information	<a href="https://montevibiano.it/">https://montevibiano.it/</a>

Farina di Basalto		
	Location	Italy
	Competences	Climate change adaption
	Keywords	Organic farming, nutrition
	Description	<p>Powder of Basalt rock is a line of products which can be used in viticulture as a support and backup for quality grape production. It is a volcanic rock flour that can protect vineyards from fungal pests and insects, as well as improve grape quality parameters. This happens due to the presence of silicon, which creates a real active defense of the plant against pathogens. It is also certified for the use in organic farming. The products can be used for foliar treatments, soil treatments and livestock use. They can also be used as probiotic activators for compost treatment. The Basalt Flour line is designed for different types of crops, from vines to horticultural crops.</p> <p>Various studies and research validating the effectiveness of these products are available on the website (<a href="https://farinadibasalto.it/guida-utilizzo/risultati-pratici-applicazione-della-farina-di-basalto/">https://farinadibasalto.it/guida-utilizzo/risultati-pratici-applicazione-della-farina-di-basalto/</a>) and some experiences of their application in the various application modalities are reported (<a href="https://farinadibasalto.it/esempi-pratici-di-applicazioni/#suolo">https://farinadibasalto.it/esempi-pratici-di-applicazioni/#suolo</a>)</p>
	Objectives	The products made from this rock flour are completely natural thus making them a valid alternative to commonly used synthetic products. The flour is also intended to stimulate plant defense, therefore rendering other treatments less necessary. Moreover, these products are environmentally friendly and free of substances that are harmful to the environment and human health. For these reasons, they do not require a waiting period.
	Tools	The products can be purchased from specialized agricultural retailers. A tool is available on the website for identifying the locations closest to your area ( <a href="https://farinadibasalto.it/i-rivenditori-dove-acquistare-i-prodotti-della-linea-farina-di-basalto/">https://farinadibasalto.it/i-rivenditori-dove-acquistare-i-prodotti-della-linea-farina-di-basalto/</a> ). Furthermore, products can be purchased online ( <a href="https://farinadibasalto.it/acquista-online/">https://farinadibasalto.it/acquista-online/</a> )
	Additional information	<a href="https://farinadibasalto.it/">https://farinadibasalto.it/</a>



Viessmann	
 <b>Location</b>	International
 <b>Competences</b>	Energy efficiency
 <b>Keywords</b>	Energy, efficiency, winery
 <b>Description</b>	<p>Viessmann is a German company that operates internationally and produces heating systems with increasingly advanced technological solutions. A detailed analysis of energy consumption in the wine sector is available on the website, followed by possible solutions which can be implemented by companies to increase energy efficiency. In addition, some experiences of wineries that have achieved goals in this regard are also listed:</p> <ul style="list-style-type: none"> <li>• Cantina Cavit: replacement of the steam generator for sterilization of the facility.</li> <li>• Cantina Antinori: installation of a heating system, also used for wine treatment.</li> <li>• Cantine Tommasi: installation of two boilers and a solar system for system cleaning and heating.</li> <li>• Cantina Mori Colli Zugna: installation of two heat pumps for heating and cleaning the production system.</li> </ul>
 <b>Objectives</b>	Research for an innovative, efficient and environmentally sustainable system for improving the industry's energy efficiency.
 <b>Tools</b>	An international manufacturer of heating systems, Viessmann, installs the system. This company offers different solutions depending on the structure of the winery, so that the energy efficiency of the industry is improved.
 <b>Additional information</b>	<p>Energy efficiency guide for wineries:  <a href="https://industriale.viessmann.it/guide/guida-efficienza-energetica-aziende-vinicole">https://industriale.viessmann.it/guide/guida-efficienza-energetica-aziende-vinicole</a></p> <p>Website:  <a href="https://www.viessmann.it/">https://www.viessmann.it/</a></p>








Vinrà!		
	Location	Italy
	Competences	Climate change adaption, soil management, energy efficiency, waste management, emission reduction, biodiversity, local & historical knowledge, sustainable wine production, critical thinking, futures literacy, systems thinking, problem framing, valuing sustainability.
	Keywords	Sustainable viticulture, virtual meeting, sustainability awareness
	Description	Vinrà is a project created with the aim of increasing awareness of sustainability in the wine sector through knowledge sharing and the enhancement of certified products. The Veneto Region, the DESAM Engineering and Environment, the University of Padova and the Sustainable Wines Network promoted it. All companies that have a sustainability certification for the wine sector (Equalitas, SOSTain or VIVA) can access the Vinrà virtual meeting point. "Best practices" for achieving complete farm sustainability in all its forms (environmental, social and economic) are available on the site. Farms that are part of the Vinrà network and achieve important goals in these terms will gain more visibility through the project itself. The project currently involves 15 companies: 11 in northern Italy, one near Naples and three in Sicily.
	Objectives	<ol style="list-style-type: none"> <li>1. Informing winemakers about best practices for sustainability.</li> <li>2. Attaching added value to the most sustainable products.</li> <li>3. Ensuring the environmental sustainability of the companies involved (reduce inputs, stimulate recycling, reduce pollution, increase biodiversity and better manage energy).</li> <li>4. Informing about outcome measurement techniques.</li> </ol>
	Tools	Farms with a sustainability certification of the wine sector can choose to voluntarily join the Vinrà project. Upon joining, they gain access to an online information exchange point. Companies also receive tools to measure their sustainability level. If they achieve good results, the Vinrà project grants them greater visibility within the sector.
	Additional information	<a href="https://vinra.it/">https://vinra.it/</a>

VIVA Program, Sustainability in the Italian Wine Sector	
 <b>Location</b>	Italy
 <b>Competences</b>	Climate change adaption, water management, soil management, energy efficiency, waste management, emission reduction, biodiversity, local & historical knowledge, sustainable wine production, critical thinking, system thinking, problem framing, valuing sustainability
 <b>Keywords</b>	Sustainable viticulture, sustainability certification, MITE (Environment and Energy Safety Ministry), training
 <b>Description</b>	<p>The VIVA Program was created to assess the sustainability of wineries. In fact, it provides a clear and traceable protocol to monitor the viticulture sector environmental impact and to evaluate the producers' efforts in socio-economic terms. The program is organized along three procedural guidelines:</p> <ol style="list-style-type: none"> <li>1. Technical procedural guidelines: these include the information for the calculation of the four impact analysis indexes (Air, Water, Vineyard and Territory).</li> <li>2. Checking procedural guidelines: these describe the parameters, the requirements and the procedures the authorities must follow during the verification and certification activity.</li> <li>3. Label procedural guidelines: these include the product's labelling guidelines and the information concerning the project's results sharing.</li> </ol>
 <b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To evaluate the use of resources.</li> <li>2. To provide a standard protocol for the study of environmental impacts.</li> <li>3. To allow the farmers to make strategies for decreasing the impacts of their activity.</li> <li>4. To inform the citizens about the program results using the label</li> <li>5. To train sector experts, by giving them know-how and new job opportunities.</li> </ol>
 <b>Tools</b>	The companies purposely choose to join the VIVA program, presenting their own programs to reach high environmental sustainability levels. Therefore, the procedural guidelines will be used to evaluate the impacts of the programs and, depending on the results of the analysis, allow the company achieve the compliance certificate.
 <b>Additional information</b>	<p>Website:  <a href="https://viticolturasostenibile.org/">https://viticolturasostenibile.org/</a></p> <p>Training course:  <a href="http://www.opentea.eu/en/e-learning/courses-La-Sostenibilit%C3%A0-nella-Vitivinicoltura-in-Italia.27/">http://www.opentea.eu/en/e-learning/courses-La-Sostenibilit%C3%A0-nella-Vitivinicoltura-in-Italia.27/</a></p>

Ángel de Viñas		
	Location	Spain
	Competences	Biodiversity, Local & historical knowledge
	Keywords	Old vineyards, biodiversity
	Description	<p>Initiative to support old vineyards, developed by the Gonzalez Byass winery group together with the González Byass Foundation and the Viticulture Research Group of the Polytechnic University of Madrid, made up of researchers of the stature of José Ramón Lissarrague, Vicente Sotés and Pilar Baeza.</p> <p>Each year, "Ángel de Viñas" will integrate three singular vineyards from any corner of the Spanish wine-growing geography, with the commitment to preserve their existence, maintain their exploitation and support their dissemination. This commitment will always have a long-term vision, so the selected vineyards will receive support for a minimum of three years to guarantee the continuity of the project. This support may consist of the purchase of grapes, wine or support in the work necessary for the maintenance of the vineyard.</p> <p>"Angel of Vines" is a further step in the objective of guaranteeing the conservation of the natural and historical heritage closely linked to the territory where it is located. It reflects our commitment to the care and protection of the soil and vineyards, in line with Sustainable Development Goal 15 "Life of terrestrial ecosystems".</p>
	Objectives	<p>It is an initiative to rescue, recover and conserve those old vineyards in Spain that are on the verge of extinction.</p> <p>Old vineyards are necessary to safeguard the biodiversity of the environment and the origin of wines with unique features that today, in some cases, are at risk of being forgotten.</p>
	Tools	Knowledge of the varieties and the soil and climate characteristics of each territory.
	Additional information	<p>Website:</p> <p><a href="https://www.gonzalezbyass.com/noticias/angel-de-vinas/conoce-mas-sobre-angel-de-vinas-nuestro-apoyo-vinedos-viejos">https://www.gonzalezbyass.com/noticias/angel-de-vinas/conoce-mas-sobre-angel-de-vinas-nuestro-apoyo-vinedos-viejos</a></p>



CO <sub>2</sub> Capture and Reuse from Wine Fermentation		
	Location	Spain
	Competences	Climate change adaptation, Emissions reduction, Sustainable wine production
	Keywords	CO <sub>2</sub> , carbon footprint, reuse, fermentation
	Description	The system consists of adapting the fermentation tanks so that the CO <sub>2</sub> released during the wine fermentation process can be channelled into large balloons placed on top of the tanks. As the wine ferments and releases CO <sub>2</sub> , it is captured inside the balloons, which then inflate. Using an air compressor, the gas is compressed to a pressure that allows it to be transferred to another tank where it is stored, to be reused later as an inert gas for filling the tanks containing wine in order to prevent oxidation.
	Objectives	Reduce the carbon footprint by reusing the CO <sub>2</sub> produced during fermentation at another stage of the process where it is also needed.
	Tools	This initiative consists of adapting the fermentation tanks so that the CO <sub>2</sub> released during the wine fermentation process can be channelled into large balloons placed on top of the tanks. When the wine releases the CO <sub>2</sub> , it is captured inside the balloons, which then inflate, and an air compressor allows it to be transferred to another tank where it is stored for later reuse.
	Additional information	Website: <a href="https://www.torres.es/noticias/familia-torres-disena-un-sistema-pionero-que-captura-y-reutiliza-el-co2-de-la-fermentacion#:~:text=Desde%20que%20puso%20en%20marcha,reducci%C3%B3n%20como%20m%C3%ADnimo%20en%202030.">https://www.torres.es/noticias/familia-torres-disena-un-sistema-pionero-que-captura-y-reutiliza-el-co2-de-la-fermentacion#:~:text=Desde%20que%20puso%20en%20marcha,reducci%C3%B3n%20como%20m%C3%ADnimo%20en%202030.</a>

VIDas		
	<b>Location</b>	Spain
	<b>Competences</b>	Biodiversity, Local & historical knowledge, Valuing sustainability, problem framing
	<b>Keywords</b>	Vineyard, biodiversity
	<b>Description</b>	This initiative brings together the environmental actions carried out to protect the biodiversity of the vineyards.
	<b>Objectives</b>	<p>It is an initiative to rescue, recover and conserve those old vineyards in Spain that are on the verge of extinction.</p> <p>Old vineyards are necessary to safeguard the biodiversity of the environment and the origin of wines with unique features that today, in some cases, are at risk of being forgotten.</p>
	<b>Tools</b>	This initiative includes several actions, such as the installation of nesting boxes in several of our vineyards, the creation of ecosystems suitable for bee pollination and the protection of forests and reforestation.
	<b>Additional information</b>	<p>Website:</p> <p><a href="https://www.gonzalezbyass.com/noticias/VIDas">https://www.gonzalezbyass.com/noticias/VIDas</a></p>

Sustainable Wineries for Climate Protection		
	<b>Location</b>	Spain
	<b>Competences</b>	Climate change awareness, climate change adaptation, Water management, Soil management, Waste management, Biodiversity, Emissions reduction, Energy efficiency, Sustainable wine production, Valuing sustainability, Systems thinking, Critical thinking, Problem framing, Futures literacy,
	<b>Keywords</b>	Sustainable, Certification, Winery
	<b>Description</b>	Sustainable Wineries for Climate Protection (SWfCP) is the first specific certification of sustainability for the wine sector. The SWfCP certification scheme defines the criteria that a sustainable winery should meet, covering environmental, social, economic and governance sustainability aspects.
	<b>Objectives</b>	To define in a reliable and quantifiable way the aspects that a sustainable winery must fulfil.
	<b>Tools</b>	The auditor assesses the winery by filling in the specific questionnaire of the SWfCP certificate.
	<b>Additional information</b>	Website: <a href="https://www.fev.es/fev/sustainable-wineries-for-climate-protection/que-es-swfc319_1_ap.html">https://www.fev.es/fev/sustainable-wineries-for-climate-protection/que-es-swfc319_1_ap.html</a>

Vitisad	
 <b>Location</b>	Spain
 <b>Competences</b>	Climate change awareness, climate change adaptation, Water management, Soil management, Waste management, Biodiversity, Emissions reduction, Energy efficiency, Sustainable wine production, Valuing sustainability, Systems thinking, Critical thinking, Problem framing, Futures literacy,
 <b>Keywords</b>	Vineyard, sustainable, climate change, adaptation, guide
 <b>Description</b>	This is guide with sustainable viticultural strategies and practices for adaptation to climate change in the POCTEFA area developed within the Vitisad project.
 <b>Objectives</b>	The objective of this guide is to offer a practical vision of the sustainable and rational management of the vineyard and present the main conclusions of the project, along with an analysis of the viticultural practices that best adjust to a changing climate scenario.
 <b>Tools</b>	Guide
 <b>Additional information</b>	<p>Website:  <a href="https://www.vitisad.eu/">https://www.vitisad.eu/</a></p> <p>Guide:  <a href="https://www.vitisad.eu/wp-content/uploads/2022/05/guide-vitisad-es-v3-1.pdf">https://www.vitisad.eu/wp-content/uploads/2022/05/guide-vitisad-es-v3-1.pdf</a></p>

## CONCLUSIONS

This guide presents the results of the research work carried out by the Green Vineyards project consortium. The main outcome is the presentation of a framework of sustainable competences that is focused on wine sector workers.

This competence framework consists of 15 competences grouped into four distinct areas. Each of them has a description, as well as the set of knowledge, skills, and aptitudes that comprise them.

As a tool for replicability and promotion of sustainable measures, the work of the consortium has led to the identification of a set of 22 sustainable practices in the sector in the largest wine producers of the European Union.



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