Co-funded by the European Union

Sustainable Transition in Viticulture

FONDAZIONE COMUNITARIA DI AGRIGENTO E TRAPANI

Cooperation Strategy among EU winemakers

Project: STIV- Leveraging artificial intelligence to manage a Sustainable Transition In Viticulture

Project Reference N°: 2024-1-FR01-Ka220-VET-000245913

2.5. Definition of the Protocol: Cooperation strategy among EU winemakers

Leader: Fondazione Comunitaria di Agrigento e Trapani

Document Identifier	**Deliverable**
Project	**STIV**
Version	**V 1**
Submission date	**09.10.2026**
Status	**Draft for Partner's Validation**
Distribution	**External project document**

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor EACEA can be held responsible for them.

Co-funded by the European Union

Sustainable Transition in Viticulture

FONDAZIONE COMUNITARIA DI AGRIGENTO E TRAPANI

Table of contents

1. Introduction **4**

1.1 Purpose of the Protocol 5

1.2 Scope of the Protocol 5

2. Context: challenges and opportunities for sustainable viticulture in Europe **6**

2.1 The transition towards sustainable viticulture 6

2.2 Climate Change and Environmental Pressures 7

2.3 Economic and Market Transformations 8

2.4 Skills Gaps and Digital Transformation in Viticulture 8

2.5 The Role of European Cooperation and Partner Regions as Pilot Ecosystems 9

3. Objectives and Strategic Vision of the STIV Cooperation Protocol **10**

3.1 Strategic Vision 10

3.2 General Objective of the Protocol 11

4. Criteria and Procedures for Mutual Recognition of Knowledge and Competence **13**

4.1 Purpose and Scope of Mutual Recognition 14

4.2 A Common Reference Framework: EQF and ECVET Alignment 14

4.3 Cross-Border Validation and Harmonisation Mechanisms 14

4.4 Recognition Instruments Adopted by the Partnership 15

4.5 Commitment of Partner Organisations to Mutual Acceptance 15

5. Good Cooperation Practices among EU Winemakers **16**

5.1. Purpose and rationale 16

5.2. Structured peer-to-peer knowledge exchange 16

5.3. Vineyard demonstrations, winery visits and practical training 18

5.4. Shared monitoring protocols and responsible data exchange 19

5.5. Cooperation with research institutions, VET providers and advisory services 20

5.6. Common technical guidance and adaptable implementation tools 21

5.7. Network coordination, governance and long-term continuity 22

5.8. Key conditions for effective and transferable cooperation 23

6. Standards for Future Participating Organisations 24

6.1. Purpose and scope of the standards 24

6.2. Standard 1 – Organisational capacity and commitment 25

6.3. Standard 2 – Cooperation and knowledge sharing 26

6.4. Standard 3 – Technical, environmental and social practices 27

6.5. Standard 4 – Data collection and monitoring 27

6.6. Standard 5 – Training and participation in network activities 28

6.7. Standard 6 – Continuous improvement 29

6.8. Implementation and review of the standards 30

7. Governance and Operational Framework 30

7.1. Governance principles 30

7.2. Roles of participating organisations 34

7.3. Decision-making 37

8. Cooperation Mechanisms and Activities 40

8.1. Knowledge Exchange 40

8.2. Training and Capacity Building 41

8.3. Peer Visits and Demonstration Activities 43

8.4. Joint Experimentation and Innovation 44

8.5. Sharing of Data and Monitoring Results 45

References and bibliography 48

1. Introduction

Viticulture represents one of the most historically significant and economically important agricultural sectors in Europe. The European Union is among the leading wine-producing regions worldwide and accounts for a substantial share of global wine production and consumption. Beyond its economic value, viticulture plays a crucial role in maintaining rural livelihoods, preserving cultural landscapes and supporting the social and environmental sustainability of many European territories.

However, the European wine sector is currently facing a number of interconnected challenges. Climate change, increasing environmental pressures, evolving consumer expectations and global market competition are reshaping the conditions under which vineyards operate. Rising temperatures, water scarcity and more frequent extreme weather events are already affecting vineyard productivity and grape quality in many wine-growing regions (IPCC, 2021; Santos et al., 2020). At the same time, the sector must adapt to new sustainability requirements and environmental policies while maintaining economic viability.

In response to these challenges, the **STIV project – Leveraging Artificial Intelligence to Manage a Sustainable Transition in Viticulture** – was developed to support the ecological and digital transformation of the European viticulture sector. The project aims to strengthen the capacity of wine producers to adopt sustainable practices and innovative technologies while improving the resilience and competitiveness of vineyards.

STIV is funded under the Erasmus+ Programme (KA220-VET – Cooperation Partnerships in Vocational Education and Training) and brings together a partnership composed of research institutions, vocational education providers, agricultural organisations and innovation actors from France, Italy, Spain and Serbia. Through this partnership, the project promotes cooperation between education, research and agricultural practice in order to facilitate the transfer of knowledge and innovation within the wine sector (European Commission, 2024).

A central objective of the project is to strengthen **green and digital competences among wine producers and professionals**, supporting the ongoing **twin transition** that combines environmental sustainability with digital innovation in agriculture. The integration of precision viticulture tools, artificial intelligence and data-driven decision systems can significantly improve the efficiency of vineyard management while reducing environmental impacts (Wolfert et al., 2017).

Within this framework, the **STIV Cooperation Protocol** has been developed as a strategic instrument to foster collaboration among wine producers and stakeholders across Europe. The protocol establishes a structured framework for cooperation, knowledge exchange and capacity building aimed at supporting the sustainable transition of the viticulture sector.

1.1 Purpose of the Protocol

The purpose of the STIV Cooperation Protocol is to create a **long-term cooperation framework among European wine producers and stakeholders** in order to facilitate the

exchange of knowledge, promote sustainable vineyard management practices and support the adoption of innovative technologies within the wine sector.

The protocol is designed to encourage collaboration among wine producers, research institutions, vocational education and training (VET) providers, agricultural advisors and other actors involved in the viticulture value chain. By strengthening cooperation across different regions and professional communities, the protocol aims to accelerate the diffusion of sustainable practices and digital innovation.

Research on agricultural innovation systems highlights the importance of collaborative networks in facilitating knowledge transfer and improving the adaptive capacity of agricultural sectors facing environmental and economic uncertainty (Klerkx, Jakku & Labarthe, 2019). In the context of viticulture, cooperation among producers and institutions can play a key role in addressing shared challenges such as climate change adaptation, resource management and technological transformation.

The STIV Cooperation Protocol therefore seeks to promote a collaborative environment in which stakeholders can share experiences, develop joint initiatives and collectively contribute to the sustainable development of the European wine sector.

Beyond providing a strategic framework, the STIV Cooperation Protocol establishes a common operational basis for long-term collaboration among its signatory organisations. It defines shared objectives, cooperation principles, minimum participation commitments, governance arrangements, mutual recognition procedures and mechanisms for monitoring joint activities. In accordance with the STIV project commitments, the Protocol also establishes an annual cooperation mechanism intended to remain active for at least five years following the end of the project.

Through this framework, signatory organisations commit to maintaining a structured dialogue, exchanging experiences and reporting on the use and application of STIV results within their respective organisations and territories.

1.2 Scope of the Protocol

The STIV Cooperation Protocol initially focuses on the wine-producing regions represented within the project partnership, including **Nouvelle-Aquitaine in France, Sicily in Italy, the Valencia Community in Spain and Vojvodina in Serbia**. These regions represent diverse viticultural contexts characterized by different climatic conditions, production systems and socio-economic environments, while sharing common challenges related to sustainability and competitiveness.

Within the framework of the STIV project, these territories function as **pilot ecosystems** for testing and developing collaborative strategies in sustainable and digital viticulture. The experiences generated in these regions will provide valuable insights into the practical implementation of cooperation mechanisms among wine producers and other stakeholders.

The protocol is designed as an **open and scalable framework**, capable of expanding beyond the initial partnership. Over time, the cooperation network may include additional

stakeholders from other European wine-producing regions, including producers' associations, research institutions, training providers, public authorities and innovation actors.

Through this progressive expansion, the STIV Cooperation Protocol aims to contribute to the development of a broader European network capable of supporting the sustainable transition of the wine sector and strengthening cooperation among wine producers across different territories.

2. Context: challenges and opportunities for sustainable viticulture in Europe

Viticulture represents one of the most historically, culturally and economically significant agricultural sectors in Europe. The European Union remains the world's leading wine-producing region and accounts for a substantial share of global wine production and consumption. In addition to its economic value, viticulture plays a fundamental role in preserving rural landscapes, sustaining local economies and maintaining cultural heritage across many European territories.

Despite its importance, the European wine sector is currently facing a period of profound transformation. Climate change, evolving market dynamics, environmental regulations and technological innovation are reshaping the conditions under which vineyards operate. These transformations require wine producers to adapt their production systems while maintaining economic viability and environmental sustainability (Ashenfelter & Storchmann, 2016; Santos et al., 2020).

The STIV project (Leveraging Artificial Intelligence to Manage a Sustainable Transition in Viticulture) was developed in response to these emerging challenges. The partnership brings together organisations from France, Italy, Spain and Serbia, representing diverse wine-growing regions such as Nouvelle-Aquitaine, Sicily, the Valencia region and Vojvodina, which share similar environmental conditions and structural challenges within the viticulture sector (European Commission, 2024).

These regions provide an important testing ground for innovative approaches aimed at improving the sustainability, resilience and competitiveness of European viticulture.

2.1 The transition towards sustainable viticulture

In recent decades, sustainable viticulture has become a central concept in the development of the global wine sector. The International Organisation of Vine and Wine (OIV) defines sustainable vitiviniculture as a global strategy that integrates economic sustainability, environmental protection and social responsibility within grape and wine production systems while preserving cultural, historical and landscape heritage (OIV, 2011).

Sustainable viticulture is typically structured around three interconnected pillars:

- **environmental sustainability**
- **economic viability**
- **social responsibility**

In practical terms, sustainable vineyard management involves the conservation of natural resources, the protection of biodiversity, efficient water use, integrated pest and disease management and the promotion of fair working conditions within rural communities (Santini et al., 2013; Mariani & Vastola, 2015).

Recent research highlights that sustainability in the wine sector must be considered along the entire production chain, including vineyard management, winery processes, packaging systems and distribution logistics. Environmental impacts are associated with water consumption, energy use, greenhouse gas emissions and waste generation, which require integrated management strategies to reduce the environmental footprint of wine production (Morata & Loira, 2022).

Despite the increasing awareness of sustainability issues, the adoption of sustainable practices remains uneven across European vineyards. Many producers face structural barriers such as limited access to technical knowledge, high transition costs and insufficient training opportunities, particularly among small and medium-sized farms (Alessandri et al., 2024).

2.2 Climate Change and Environmental Pressures

Climate change represents one of the most significant challenges currently affecting viticulture worldwide. Grapevine production is highly sensitive to environmental conditions such as temperature, precipitation, solar radiation and soil characteristics. Even relatively small changes in climate variables can significantly influence grape yields, phenology and wine quality (Jones & Davis, 2000; Kenny & Harrison, 1992).

Scientific studies show that climate change is already altering key aspects of vineyard production, including:

- earlier budburst and grape ripening
- modifications in grape composition and wine characteristics
- shifts in suitable wine-growing regions
- increased frequency of droughts and extreme weather events
- higher incidence of pests and diseases

Temperature increases may accelerate grape maturation, resulting in higher sugar concentrations, increased alcohol levels and lower acidity, potentially affecting wine balance and typicity (Ashenfelter & Storchmann, 2016).

Mediterranean wine regions such as **Spain, Italy and southern France** are particularly vulnerable to these changes. Rising temperatures and water scarcity are already forcing producers to modify vineyard management strategies, including irrigation practices, canopy management and harvest timing.

In response to these challenges, researchers and practitioners are increasingly promoting **climate-smart and regenerative viticulture practices**, such as soil regeneration, biodiversity enhancement, improved water management and the development of climate-resilient grape varieties (Brunori et al., 2016; Batchelor et al., 2019).

These practices aim to increase vineyard resilience while reducing environmental impacts and maintaining long-term productivity.

2.3 Economic and Market Transformations

Alongside environmental pressures, the European wine sector is also experiencing significant economic transformations.

Global competition from emerging wine-producing regions, fluctuations in international demand and changing consumer preferences are reshaping the global wine market. Consumers are increasingly interested in wines produced through environmentally responsible practices and sustainable supply chains (Kelley et al., 2017; Kelley et al., 2022).

At the same time, the transition toward sustainable production often requires substantial investments in new technologies, certification systems and innovative vineyard management practices. These investments can represent a barrier for many small and medium-sized wine producers, particularly when the economic return on sustainable practices is uncertain or delayed (Stranieri et al., 2021).

Climate variability also has direct economic consequences for wine producers. Variations in production volumes and grape quality can significantly influence market prices and the competitiveness of different wine regions (Ashenfelter & Storchmann, 2016).

Nevertheless, sustainable viticulture can also generate long-term economic benefits. Improved resource efficiency may reduce production costs, while sustainable production practices may increase the added value of wines in markets where consumers are increasingly sensitive to environmental issues (Alessandri et al., 2024).

2.4 Skills Gaps and Digital Transformation in Viticulture

Another important challenge affecting the European wine sector concerns the **lack of green and digital skills among agricultural professionals**.

Research conducted during the preparation phase of the STIV project identified several critical gaps in the partner countries, including limited digital literacy among farmers, weak participation in collaborative networks and insufficient integration between the viticulture sector and vocational education and training (VET) systems (European Commission, 2024).

At the same time, technological innovation is opening new opportunities for improving

vineyard management. Advances in **precision viticulture**, remote sensing technologies, satellite monitoring and artificial intelligence allow producers to collect large volumes of environmental and agronomic data.

These technologies support more accurate decision-making processes, enabling producers to optimize irrigation, fertilizer application, pest management and harvest planning while reducing resource consumption and environmental impacts (Morata & Loira, 2022).

Artificial intelligence and data-driven agriculture are increasingly considered key tools for addressing the growing complexity of modern agricultural systems and improving the sustainability and efficiency of vineyard operations.

2.5 The Role of European Cooperation and Partner Regions as Pilot Ecosystems

Given the transnational nature of environmental, economic and technological challenges affecting the wine sector, effective responses require coordinated action at the European level.

Collaboration between wine producers, research institutions, training providers and public authorities can facilitate knowledge exchange, accelerate the adoption of innovative technologies and support the development of shared strategies for sustainable vineyard management. In particular, cooperative networks allow producers to exchange best practices, reduce the risks associated with innovation and strengthen the overall resilience of the wine sector.

The STIV project contributes to this objective by promoting the creation of a **European cooperation framework among winemakers**, aimed at strengthening knowledge exchange, improving green and digital competences and fostering long-term collaboration within the European viticulture sector.

Within this framework, the regions involved in the STIV partnership play a crucial role as pilot ecosystems for the implementation of the cooperation protocol. The regions involved in the project are characterized by a strong viticultural tradition, significant economic reliance on wine production and diverse climatic and socio-economic conditions.

At the same time, they share several common challenges typical of many European wine regions, including climate variability, water scarcity, pressure on natural resources, market competition and the need to strengthen digital and sustainability-related skills among producers. The presence of both EU member states and a partner country such as Serbia further enhances the cross-border dimension of the initiative and promotes knowledge exchange beyond the boundaries of the European Union (European Commission, 2024).

These territories therefore represent **living laboratories** in which innovative solutions related to sustainable vineyard management, digital agriculture and cooperative governance models can be tested and refined. Experiences developed within these pilot regions can generate valuable insights and good practices that may subsequently be transferred to other wine-producing areas.

The cooperation protocol developed within the STIV project is therefore designed to function as a **scalable and transferable framework**. While its initial implementation focuses on the partner regions, the protocol is conceived as an open and evolving system that can progressively incorporate additional stakeholders from other European wine-producing territories.

In particular, the project foresees the possibility of expanding cooperation towards neighbouring regions with similar agro-climatic conditions and viticultural traditions. For example, knowledge transfer mechanisms may involve stakeholders in **Portugal, Greece, Germany and Romania**, building a wider European network capable of promoting sustainable and digitally enabled viticulture across different territories (European Commission, 2024).

By establishing structured mechanisms for collaboration, knowledge sharing and mutual learning, the STIV cooperation protocol aims to strengthen the capacity of European wine producers to address common challenges and contribute to the long-term sustainability and competitiveness of the sector.



3. Objectives and Strategic Vision of the STIV Cooperation Protocol

The STIV Cooperation Protocol is designed as a strategic framework to support the sustainable and digital transformation of the European viticulture sector through enhanced collaboration among wine producers, research institutions, training providers and other stakeholders. Building on the contextual challenges outlined in the previous chapter, the protocol aims to foster a shared vision for the future of European viticulture based on

sustainability, innovation and knowledge exchange.

The increasing complexity of modern agricultural systems, combined with environmental pressures and evolving market dynamics, requires collective responses that go beyond individual farm-level strategies. Collaborative approaches have been widely recognised as a key factor in improving resilience and innovation capacity within agri-food systems (Klerkx, Jakku & Labarthe, 2019). In the wine sector, cooperation between producers, researchers and educators plays a fundamental role in accelerating the adoption of sustainable practices and technological innovation.

Within this perspective, the STIV Cooperation Protocol aims to establish a structured and long-term framework for collaboration among European winemakers, initially involving the partner regions participating in the project and progressively expanding to other wine-producing territories.

3.1 Strategic Vision

The strategic vision of the STIV Cooperation Protocol is to contribute to the development of a **resilient, sustainable and knowledge-driven European viticulture sector**, capable of responding effectively to environmental, economic and technological challenges.

The protocol promotes a shared understanding of sustainability that integrates environmental stewardship, economic viability and social responsibility within vineyard management and wine production systems (Santini et al., 2013; Morata & Loira, 2022). This vision aligns with the broader objectives of the European Green Deal and the Farm to Fork Strategy, which emphasize the need to transition towards more sustainable and resource-efficient agricultural systems.

In the context of viticulture, sustainability involves not only reducing environmental impacts but also preserving the cultural landscapes, biodiversity and socio-economic vitality of rural areas where vineyards are located (Mariani & Vastola, 2015). The STIV Cooperation Protocol therefore seeks to promote production models that combine environmental responsibility with long-term competitiveness.

A key element of this vision is the integration of **digital technologies and data-driven decision-making tools** within vineyard management. Advances in precision agriculture, artificial intelligence, remote sensing and big data analytics are increasingly transforming agricultural practices, enabling producers to monitor vineyard conditions more accurately and optimize the use of inputs such as water, fertilizers and pesticides (Wolfert et al., 2017).

By facilitating access to knowledge and technological innovation, the STIV protocol aims to empower wine producers to navigate the ongoing **twin transition**, which combines environmental sustainability with digital transformation.

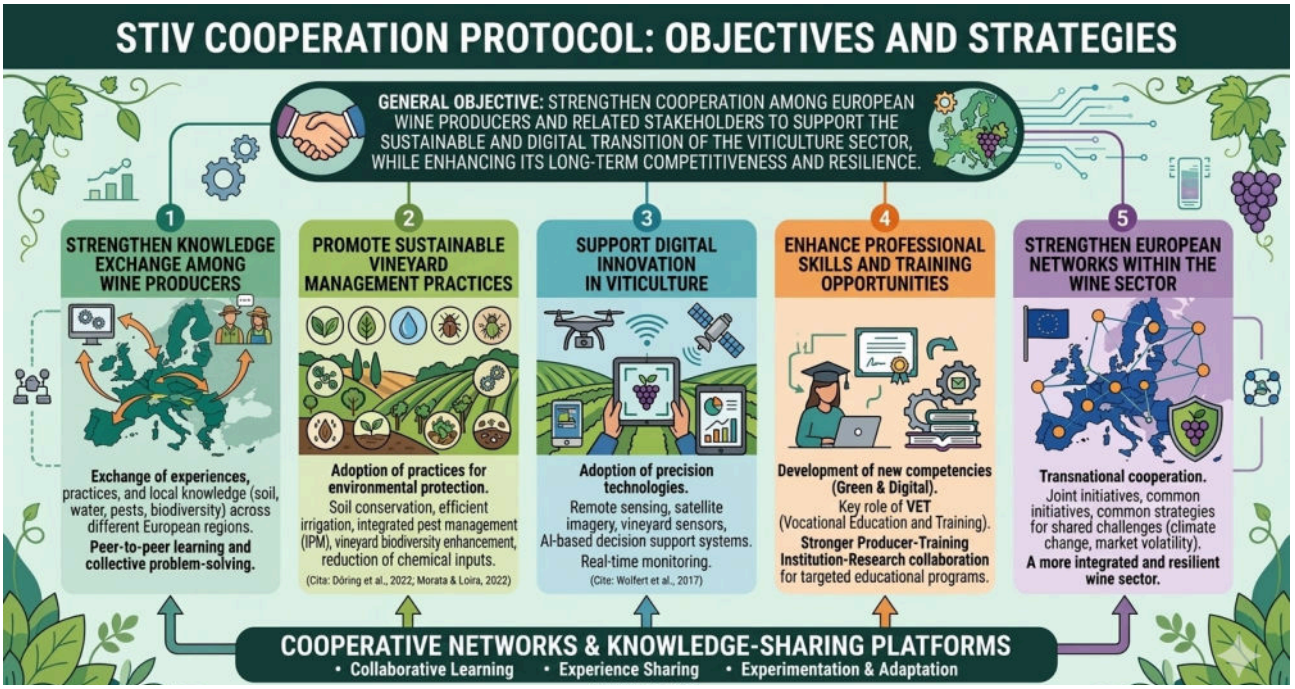
3.2 General Objective of the Protocol

The general objective of the STIV Cooperation Protocol is:

to strengthen cooperation among European wine producers and related stakeholders in order to support the sustainable and digital transition of the viticulture sector while enhancing its long-term competitiveness and resilience.

This objective reflects the need to address several structural challenges affecting European viticulture, including climate change, market volatility, technological transformation and the need to improve professional skills in the agricultural workforce.

Cooperative networks and knowledge-sharing platforms have been shown to play a crucial role in facilitating the diffusion of innovation within agricultural systems. In particular, collaborative learning environments allow producers to exchange experiences, experiment with new practices and collectively adapt to emerging challenges (Klerkx et al., 2019).



To achieve its general objective, the STIV Cooperation Protocol pursues several specific objectives.

1. **Strengthening knowledge exchange among wine producers**
   One of the primary goals of the protocol is to facilitate the exchange of knowledge, experiences and best practices among wine producers across different European regions. Viticulture is highly dependent on local environmental conditions, and producers often develop valuable site-specific expertise related to soil management, water use, pest control and vineyard biodiversity. However, these experiences are not always effectively shared beyond local networks.
   By creating structured mechanisms for knowledge exchange, the protocol aims to promote peer learning and collective problem-solving among wine producers.

2. **Promoting sustainable vineyard management practices**
   The protocol seeks to encourage the adoption of sustainable vineyard management practices that contribute to environmental protection, climate change mitigation and resource efficiency. These practices include:

   a. soil conservation and organic matter management
   b. efficient irrigation systems
   c. integrated pest management strategies
   d. biodiversity enhancement within vineyard ecosystems
   e. reduction of chemical inputs.

   Scientific research indicates that sustainable viticulture practices can significantly reduce the environmental footprint of wine production while maintaining or even improving vineyard resilience and productivity (Döring et al., 2022; Morata & Loira, 2022).

3. **Supporting digital innovation in viticulture**
   Another key objective of the STIV protocol is to facilitate the adoption of digital technologies within the wine sector. Precision viticulture technologies such as remote sensing, satellite imagery, vineyard sensors and artificial intelligence-based decision support systems allow producers to monitor environmental conditions and optimize vineyard management practices in real time (Wolfert et al., 2017). However, the adoption of these technologies remains limited in many wine-producing regions due to insufficient digital skills and limited access to training. By promoting training initiatives and knowledge-sharing activities, the protocol aims to improve digital literacy among wine producers and support the integration of innovative tools within vineyard management systems.

4. **Enhancing professional skills and training opportunities**
   The transition towards sustainable and digital viticulture requires new competencies among agricultural professionals. In this context, vocational education and training (VET) systems play a crucial role in supporting the development of green and digital skills within the agricultural sector. The STIV Cooperation Protocol therefore promotes stronger collaboration between wine producers, training institutions and research organisations in order to develop educational programmes aligned with the evolving needs of the sector. Strengthening the link between agricultural practice and education can facilitate the diffusion of innovation and ensure that future generations of wine professionals are equipped with the knowledge and skills required to manage sustainable vineyard systems.

5. **Strengthening European networks within the wine sector**
   Finally, the protocol aims to strengthen transnational cooperation among wine producers and related stakeholders across Europe. The creation of European networks can facilitate the exchange of knowledge, promote joint initiatives and support the development of common strategies for addressing shared challenges such as climate change, market volatility and regulatory developments. By fostering collaboration across different regions, the STIV Cooperation Protocol seeks to contribute to the development of a more

integrated and resilient European wine sector.

6. **Ensuring the long-term sustainability of transnational cooperation**
   The Protocol aims to ensure the continuity of cooperation established through the STIV project beyond the Erasmus+ funding period. To achieve this objective, signatory organisations commit to maintaining a structured cooperation framework for at least five years following project completion. This commitment includes participation in an annual online cooperation meeting, sharing information on activities implemented using STIV results, identifying emerging cooperation opportunities and contributing to the periodic review of the network's priorities. The long-term cooperation framework seeks to transform the relationships established during the project into a sustainable European network supporting knowledge exchange, skills development and innovation in the viticulture sector.

Specific Objective	Expected Observable Results
1. Strengthening knowledge exchange among wine producers	Exchange of good practices, technical experiences and lessons learned through peer-learning activities, thematic meetings and shared knowledge resources.
2. Promoting sustainable vineyard management practices	Adoption, adaptation or testing of sustainable viticulture practices by participating organisations, documented through case studies, self-assessments or progress reports.
3. Supporting digital innovation in viticulture	Increased use or experimentation with digital technologies, precision viticulture tools and AI-based solutions, documented through practical applications and shared experiences.
4. Enhancing professional skills and training opportunities	Implementation of training and capacity-building activities using STIV educational resources, with documented participation and evidence of competence development.
5. Strengthening European networks within the wine	Formal participation of organisations in the STIV cooperation network, development of cross-border exchanges and establishment of new collaborative

sector	initiatives.
6. Ensuring the long-term sustainability of transnational cooperation	Organisation of at least one annual online cooperation meeting for five years after project completion, supported by meeting minutes, annual activity reports and documented follow-up actions.

4. Criteria and Procedures for Mutual Recognition of Knowledge and Competence

One of the central purposes of the STIV Cooperation Protocol, as established in the project's memorandum of understanding, is to enable the partner organisations to mutually accept their respective criteria and procedures for the validation and recognition of knowledge and competence across the different realities of European viticulture represented within the partnership. This chapter defines the common reference framework, the validation mechanisms and the recognition instruments through which such mutual acceptance is achieved, building on the assessment and validation system developed within the project's Skills Assessment, Validation and Recognition Tools (Deliverable A2.2).

4.1 Purpose and Scope of Mutual Recognition

Within the STIV cooperation framework, signatory organisations agree to recognise assessment results and competence certificates issued by other participating organisations as valid evidence of learning outcomes achieved through STIV training activities, provided that the agreed assessment and validation procedures have been followed. Such mutual recognition supports transparency, comparability and transferability of competences within the STIV network.

It does not automatically constitute formal recognition of a professional qualification, the award of ECTS or other credits, or equivalence within national qualification systems. Any formal recognition remains subject to the applicable national regulations and the institutional competences of the receiving organisation. This mutual acceptance covers the competences developed through the four STIV learning modules – Social Transition, Digital Transition, Green and Energy Transition, and New Products and Business Models in Viticulture – as defined in the STIV competence framework.

The scope of mutual recognition is initially limited to the partner organisations of the STIV consortium but is designed, consistently with the objectives set out in Chapter 3, to be extended in the future to new organisations that adhere to the standards described in the following chapters of this Protocol.

4.2 A Common Reference Framework: EQF and ECVET Alignment

Mutual recognition among partners relies on a shared reference framework that makes competences intelligible and comparable across the different national VET systems represented in the partnership. Learning outcomes achieved through STIV are described according to the descriptors of the European Qualifications Framework (EQF) – knowledge, skills, and responsibility/autonomy – providing a common language for VET institutions, training providers and stakeholders in every partner country.

In addition, the partnership adopts ECVET-inspired principles, organising each module as a coherent unit of learning outcomes accompanied by explicit assessment criteria and validation procedures. Although ECVET is no longer promoted as a standalone system, its core ideas – evidence-based validation and unit-based recognition – allow competences validated in one partner organisation to be understood, and accepted, by all the others.

4.3 Cross-Border Validation and Harmonisation Mechanisms

Because the STIV partnership operates across multiple countries and institutional contexts, the Protocol establishes practical mechanisms to ensure that validation practices are interpreted consistently by every signatory organisation. These mechanisms are intentionally simple and embedded in the existing project cooperation, so as to guarantee both feasibility during the project and sustainability beyond its end.

- Use of common assessment and validation tools, including the STIV Learning Outcomes Assessment Grid, shared performance level descriptors, the validation checklist and the STIV Competence Certificate template.
- Cross-border dialogue and shared pedagogical planning, carried out during project meetings and coordination events, through which partners jointly review assessment approaches and clarify the interpretation of criteria.
- Exchange of illustrative evidence, such as anonymised samples of learners' work and completed assessment grids, allowing trainers in different countries to benchmark their judgements against one another.

Through these mechanisms, the partner organisations achieve a shared culture of assessment and a strengthened basis of mutual trust, providing the foundations for a more structured cross-border validation system should the partnership choose to develop one in the future.

Phase	Activity	Responsible
1	Assessment of learning outcomes	Training provider
2	Validation of results	Assessing organisation

3	Issuance of competence certificate	Issuing organisation
4	Recognition of documented results	Receiving signatory
5	Recording and follow-up	Designated contact person

4.4 Recognition Instruments Adopted by the Partnership

Mutual recognition among the STIV partner organisations is made operational through a small set of shared instruments, developed as part of the project's Skills Assessment, Validation and Recognition Tools (A2.2). Participating organisations agree to recognise the STIV assessment and validation instruments as common reference tools within the STIV cooperation framework, where compatible with their institutional competences and applicable national frameworks.

- STIV Competence Certificate – issued by the partner organisation where the learner completed the training, it records the modules completed, the learning outcomes achieved and the transversal competences demonstrated, and is accepted as valid evidence of competence by all other signatory organisations.
- Competence Portfolio – a consolidated record of the evidence produced by the learner, which partner organisations may use to complement the certificate when a more detailed picture of competence is required.
- ECVET-inspired documentation of workload and competence achievement – describing each module in terms of learning volume and knowledge-skills-autonomy descriptors, to facilitate the understanding and potential recognition of STIV competences beyond the partnership.

4.5 Commitment of Partner Organisations to Mutual Acceptance

By signing the STIV Memorandum of Understanding and adhering to this Protocol, participating organisations express their commitment to applying the common assessment, validation and recognition principles described in this chapter, within the limits of their institutional competences and applicable national frameworks. The partners further commit to applying the common criteria and tools described in this chapter consistently, and to reviewing and updating them jointly, whenever necessary, to reflect the evolving needs of the European wine sector.

This commitment to mutual acceptance constitutes the operational core of the memorandum of understanding underlying the STIV Cooperation Protocol, and provides the basis upon which the good cooperation practices and standards described in the following chapters are built.

5. Good Cooperation Practices among EU Winemakers

5.1. Purpose and rationale

The sustainable and digital transition of European viticulture requires forms of cooperation that go beyond occasional exchanges of information. Wine producers and other sector stakeholders operate in highly diverse climatic, economic, technical and regulatory conditions. At the same time, they face a number of common challenges, including climate change, water scarcity, soil degradation, biodiversity loss, disease pressure, increasing production costs, changing consumer expectations and the need to develop green and digital skills.

European viticulture is characterised by a large number of holdings with different structural profiles, production models and capacities. In this context, cooperation can help organisations reduce the risks associated with innovation, access specialised knowledge, share resources and develop common responses to common challenges (Šajn, 2023).

Research on sustainability transitions in the wine sector shows that collaboration is particularly important where innovation requires the involvement of multiple actors, including producers, advisors, researchers, public institutions, training providers and supply-chain partners. Collaborative networks can reduce uncertainty, facilitate access to specialised knowledge and support the implementation of practices that may be difficult for individual organisations to adopt independently (Hillis et al., 2018; Martínez-Falcó et al., 2024).

The STIV Cooperation Protocol therefore promotes a practical and long-term model of cooperation among wine producers, research institutions, vocational education and training providers, agricultural advisors, professional associations and other relevant stakeholders. The purpose of this chapter is not to provide an exhaustive review of European cooperation projects. Instead, it identifies six recurring cooperation practices that are relevant to the STIV partnership and can be transferred across the participating regions.

These practices support the project's strategic objective of strengthening sustainable vineyard management, digital innovation, professional competences and transnational knowledge exchange. They are also consistent with the OIV approach to sustainable vitiviniculture, which recognises the importance of collective strategies, stakeholder engagement, measurable objectives, monitoring, training and continuous improvement (OIV, 2016).

Documented European experience: the WINETWORK project

A concrete European example of cooperation addressing shared viticultural challenges is WINETWORK, a Horizon 2020 project implemented from April 2015 to September 2017 under grant agreement No. 652601 and coordinated by the Institut Français de la Vigne et du Vin. The project focused on the exchange and transfer of knowledge concerning grapevine trunk diseases and Flavescence dorée. Its cooperation model combined regional facilitator

agents, technical working groups involving practitioners, and scientific working groups. The final reporting records 219 winegrower interviews across ten regions, the direct involvement of 431 stakeholders from practice and academia, and an online knowledge reservoir containing more than 531 documents (European Commission, CORDIS, 2017).

This experience provides documented evidence that transregional cooperation can bring together practical and scientific knowledge around clearly defined sectoral problems and produce resources accessible beyond individual participating organisations. Its relevance as a good practice lies in the combination of producer involvement, scientific input and facilitated knowledge transfer. The reported figures demonstrate participation and knowledge-production outputs; they should not, however, be interpreted as proof of a quantified reduction in disease incidence or production costs. For transfer to other contexts, the central conditions are a clearly shared challenge, meaningful practitioner participation and mechanisms that make the resulting knowledge usable across different regions.

5.2. Structured peer-to-peer knowledge exchange

A first good cooperation practice is the establishment of regular and structured mechanisms for peer-to-peer knowledge exchange. Wine producers often develop valuable practical knowledge through direct experience in vineyard management, winemaking, soil conservation, water use, crop protection, machinery management, energy efficiency and adaptation to local climatic conditions. However, this knowledge is not always documented, shared or transferred beyond local informal networks.

A structured peer-learning approach enables producers, technicians, advisors and researchers to discuss common challenges, compare alternative practices and identify locally appropriate solutions. Such exchanges can take place through thematic working groups, technical meetings, online sessions, regional round tables, producer forums or cross-border exchanges among partner regions.

Peer-to-peer learning is particularly effective when it is supported by participatory processes in which producers are not only recipients of technical recommendations but also active contributors to problem definition, experimentation and evaluation. Participatory research in viticulture has shown that sustained interaction among winegrowers, researchers, advisors, civil-society organisations and public actors can generate actionable knowledge and support the adoption of more sustainable vineyard practices across different territories (Dumont et al., 2021).

This approach is relevant to the STIV network because it recognises that technical knowledge must be adapted to local conditions and validated through dialogue with those who manage vineyards and wineries on a daily basis. Structured exchange should therefore include space for discussing operational constraints, economic implications, labour requirements and possible barriers to adoption.

For the STIV network, knowledge-sharing activities should be organised around practical themes that are relevant to the annual vineyard and winery cycle. Possible topics include climate adaptation, irrigation management, soil health, biodiversity, integrated pest management, disease forecasting, precision viticulture, sensor use, satellite monitoring,

digital decision-support systems, energy management and reduction of inputs.

The effectiveness of peer-to-peer learning depends on three conditions. First, discussion should be based on concrete operational problems rather than generic presentations. Second, participation should involve both practitioners and technical experts. Third, a facilitator or coordinator should collect key findings, identify unresolved questions and ensure that relevant information is shared with the wider network.

The OIV highlights the importance of stakeholder engagement, collective action and the exchange of knowledge in supporting progress towards sustainable vitiviniculture (OIV, 2016).

Documented practice: collecting and discussing winegrowers' experience in WINETWORK

WINETWORK provides a documented example of structured knowledge exchange in which winegrowers' practical experience was treated as a source of knowledge rather than merely as an audience for dissemination. Regional facilitator agents conducted 219 winegrower interviews across ten regions to collect information on the understanding and management of grapevine trunk diseases and Flavescence dorée. Technical working-group meetings supported the analysis of the practices collected, while two scientific working groups assembled relevant scientific knowledge. The project thus connected experience originating in vineyards with technical discussion and scientific expertise (European Commission, CORDIS, 2017).

The final report identifies improved information flows between academia and practitioners and between European regions as a project result. It also reports that the interviews and technical discussions revealed an unresolved need to assess the economic losses associated with the two diseases at European, national and regional levels. This illustrates the value of structured exchange not only for disseminating existing knowledge, but also for identifying questions that require further research. The transferable elements are the involvement of producers as knowledge contributors, discussion organised around specific operational problems, and facilitation that connects local experience with wider technical and scientific knowledge.

Recommended cooperation actions:

- Organise periodic thematic meetings among wine producers and relevant stakeholders.
- Establish working groups on priority topics identified by the network.
- Encourage participants to share successful practices, challenges, failed trials and lessons learned.
- Prepare concise summaries of technical discussions and distribute them within the network.
- Use digital communication tools to facilitate exchange between in-person meetings.
- Involve research institutions and advisors when scientific or technical clarification is required.

5.3. Vineyard demonstrations, winery visits and practical training

A second effective cooperation practice consists of learning through direct observation and practical demonstration. Viticulture is strongly influenced by local conditions, including climate, soil type, vineyard altitude, slope, grape variety, training system, water availability, disease pressure, machinery availability and labour organisation. For this reason, practical learning activities are often more effective than purely theoretical training.

Vineyard and winery visits allow participants to observe practices in real operational conditions, discuss the technical and economic implications of implementation and assess whether a practice could be transferred to a different territory or production system. Demonstration activities may concern, for example, cover-crop management, soil erosion prevention, irrigation technologies, pruning approaches, disease monitoring, mechanical weed control, biodiversity measures, drone applications, sensor installation, data collection methods or energy-saving measures in wineries.

Practical training should not be limited to isolated events. A more effective model combines technical introduction, field demonstration, participant discussion and follow-up evaluation. This allows organisations to test selected practices, assess their results and share feedback with other members of the network.

Demonstration activities are most effective when they combine direct observation, facilitated discussion and follow-up support. The adoption of sustainability practices is influenced not only by the technical quality of a proposed solution, but also by the extent to which producers perceive it as economically feasible, compatible with their production system and supported by trusted professional networks. Research on winegrower participation in sustainability partnerships has found a positive association between participation in partnership activities and the adoption of sustainable vineyard-management practices, particularly where producers perceive clear private benefits and have access to dense social networks (Hillis et al., 2018). For this reason, STIV demonstration activities should include practical discussion of costs, expected benefits, implementation requirements, possible risks and adaptation options. The participation of host producers is particularly valuable because they can explain how the practice has been integrated into real vineyard or winery operations.

The OIV recognises training, knowledge development and the exchange of experience as important components of sustainable vitiviniculture (OIV, 2016).

Documented practice: technical workshops and training resources in WINETWORK

A documented example relevant to the practical-training component of this practice is the programme of technical workshops and learning resources developed through WINETWORK. The project's final reporting confirms that workshops, oral presentations and other dissemination activities were organised to communicate knowledge on grapevine trunk diseases and Flavescence dorée to winegrowers and innovation support services. Facilitator agents worked with scientific working groups to prepare updated materials, and the online knowledge reservoir included technical datasheets, presentations, videos, training resources

and end-user flyers. CORDIS also lists local technical workshop reports and training modules among the project's deliverables (European Commission, CORDIS, 2017, 2022).

This example illustrates cooperation between practitioners, facilitators and scientific experts to translate specialist knowledge into formats intended for practical use. The documented achievement is the delivery of workshops and accessible learning materials, rather than a measured rate of subsequent adoption. Its transferability depends on addressing a specific production problem, presenting knowledge in accessible technical formats and linking learning activities with resources that participants can consult afterwards. The available reporting does not establish the occurrence or outcomes of a particular vineyard demonstration or winery visit; WINETWORK is therefore cited here as evidence of technical training and knowledge transfer, not as proof of a specific field-demonstration event.

Recommended cooperation actions:

- Organise rotating vineyard and winery visits hosted by participating organisations.
- Select a specific technical theme for each visit or demonstration.
- Involve the host organisation in explaining both the practice and the conditions required for implementation.
- Develop simple technical materials, including factsheets, checklists, photographs and short videos.
- Collect participant feedback after each activity.
- Encourage participants to report whether they have adopted, adapted or tested the demonstrated practice.

5.4. Shared monitoring protocols and responsible data exchange

A third key cooperation practice is the use of shared monitoring protocols and comparable data collection systems. Cooperation becomes more effective when organisations can observe common trends, compare results and evaluate whether specific actions are contributing to sustainability, efficiency or resilience.

The STIV network should establish a proportionate and feasible common monitoring framework. The objective should not be to impose an excessively complex reporting system or to create an administrative burden for small and medium-sized enterprises. Instead, participants should agree on a limited set of relevant indicators that can be collected consistently and used to support practical decision-making.

Depending on the scope of the activity, common monitoring may include climatic and phenological observations, disease incidence, water use, energy use, soil-cover management, erosion-risk measures, treatment frequency, use of plant-protection products, biodiversity actions, training participation, adoption of digital tools or other indicators selected by the network.

Common definitions, templates and collection methods are necessary to ensure that the information produced by different organisations can be compared meaningfully. The network should also establish rules concerning confidentiality, data ownership, aggregation and use of

information. Commercially sensitive data should not be disclosed without the explicit agreement of the participating organisation.

In addition to supporting internal decision-making, harmonised data collection can strengthen cooperation among producers, researchers and policy actors. A knowledge-driven framework for sustainable viticulture proposes the integration of climate, phenological and field-level information through shared decision-support platforms, enabling data-driven collaboration among winegrowers, researchers and public stakeholders. Such approaches may improve climate adaptation, support early identification of risks and facilitate the transfer of knowledge across regions, provided that governance arrangements clearly define data access, confidentiality and the permitted use of shared information (Radonjić et al., 2025).

The STIV monitoring system should therefore apply the principle of "data minimisation with practical value": only data that are relevant to agreed objectives, feasible to collect and useful for collective learning should be requested from participating organisations.

The OIV recommends evaluating sustainability through suitable indicators, monitoring progress and using assessment results to identify improvement actions. These principles support the development of an agreed monitoring framework without requiring identical implementation procedures in every organisation (OIV, 2016).

Documented application: territorial sustainability assessment in Montepulciano

The collective sustainability-certification pathway undertaken by the Consorzio del Vino Nobile di Montepulciano provides a concrete example of producers participating in a shared assessment framework. On 24 May 2022, following a three-year pathway, the denomination obtained sustainability certification under the Equalitas standard. The framework includes environmental requirements concerning biodiversity, carbon footprint and water footprint, together with socioeconomic requirements, progressive objectives and sustainability reporting (Equalitas, 2022; Consorzio del Vino Nobile di Montepulciano, n.d.)

The case demonstrates how a territorial organisation and participating producers can work within common requirements rather than relying exclusively on unrelated individual assessments. The documented outcome is the achievement of certification at denomination level; this does not, by itself, establish the magnitude of environmental improvements caused by the initiative. Its relevance to shared monitoring lies in the use of an agreed framework with measurable and verifiable requirements. Transfer to other regions requires consistent assessment boundaries, suitable indicators and the capacity of participating organisations to provide the necessary information (Consorzio del Vino Nobile di Montepulciano, n.d.)

The case should not be presented as evidence of a specific inter-company data-sharing or confidentiality arrangement, since the cited sources do not describe those arrangements. Instead, it supports the common-monitoring component of the practice. The complementary principle of using agreed indicators and analysing results to develop improvement plans is explicitly set out in the OIV sustainability principles (OIV, 2016).

Recommended cooperation actions:

- Define a common minimum dataset for monitoring activities.
- Develop harmonised templates and guidance for data collection.
- Agree on common terminology, measurement units and reporting periods.
- Collect only data that are relevant to the objectives of the network.
- Analyse and communicate results in aggregate or anonymised form where appropriate.
- Establish confidentiality and data-governance arrangements before data are exchanged.
- Review the monitoring framework periodically in order to improve feasibility and usefulness.

5.5. Cooperation with research institutions, VET providers and advisory services

A fourth good cooperation practice is the establishment of stable links between wine producers, research institutions, vocational education and training providers, laboratories, agricultural advisors and other knowledge providers. The sustainable and digital transition requires not only the dissemination of scientific knowledge, but also the ability to translate research findings into practical and economically viable solutions.

Research institutions can support participating organisations through experimental trials, scientific validation, technical interpretation of data, development of decision-support tools and evaluation of sustainability outcomes. VET providers can contribute by designing practical training programmes that respond to the actual skills needs of wine professionals. Advisors and extension services can play a key role in translating research findings into day-to-day vineyard and winery management.

The involvement of research and training organisations is particularly important where sustainable viticulture requires the integration of agronomic knowledge, environmental monitoring, digital technologies and management skills. Transdisciplinary research in viticulture has demonstrated that collaboration across disciplinary and stakeholder boundaries can help transform complex sustainability questions into locally applicable practices and shared action plans (Dumont et al., 2021).

Within STIV, cooperation with VET providers should not be limited to delivering general training. Training activities should be developed in response to identified needs and should include practical modules on data management, precision viticulture, digital decision-support tools, sustainable resource use and interpretation of agronomic and environmental indicators.

This relationship should be reciprocal. Producers should not be treated merely as final recipients of information. They should actively contribute to the definition of research priorities, pilot activities and training needs. Their experience is essential for identifying technical barriers, implementation costs, data requirements and the practical relevance of innovative solutions.

The OIV recognises research, education, training and stakeholder cooperation as elements supporting the development and implementation of sustainable vitivinicultural practices (OIV,

2016).

Documented practice: linking practitioner needs with scientific expertise in WINETWORK

WINETWORK offers a concrete example of cooperation between winegrowers, scientific experts and knowledge-transfer intermediaries. Practical information was collected through winegrower interviews and technical working groups, while two scientific working groups gathered research-based knowledge on grapevine trunk diseases and Flavescence dorée. Facilitator agents connected these sources of knowledge and worked with the scientific groups to develop updated materials for winegrowers and innovation support services. The final report identifies the facilitator-agent role as crucial to bridging the gap between research and practice (European Commission, CORDIS, 2017).

The project also documented mechanisms for producers to contribute to future research priorities. Its listed deliverables include the *Report on research needs expressed by the winegrowers*, workshop reports concerning future research agendas, and a *Future research agenda for the network*. These outputs show that cooperation extended beyond communicating research findings: it also incorporated practitioner needs into the identification of future research questions (European Commission, CORDIS, 2022).

The transferable practice is therefore a reciprocal relationship in which producers contribute operational knowledge and research needs, scientific actors provide specialist expertise, and intermediaries support translation between the two. The sources substantiate this research–practice relationship, but do not establish a specific institutional partnership with VET providers. The VET dimension should consequently be understood as a relevant application for STIV rather than as a documented component of WINETWORK.

Recommended cooperation actions:

- Establish contact points with universities, research centres, laboratories and VET providers.
- Identify annual research, training and technical priorities through consultation with producers.
- Promote on-farm and in-winery pilot trials where appropriate.
- Develop training modules on green and digital skills.
- Facilitate access to technical advisors and specialised expertise.
- Translate scientific and technical results into practical guidance for producers.
- Encourage producers to provide feedback on the feasibility and usefulness of proposed innovations.

5.6. Common technical guidance and adaptable implementation tools

A fifth cooperation practice is the development of common technical guidance that gives participating organisations a shared orientation while leaving adequate flexibility for local adaptation. A common framework is especially important in a transnational network such as STIV, which includes territories with different climatic conditions, varieties, production

systems, regulatory contexts and organisational capacities.

Common guidelines should not prescribe identical practices for every organisation. Instead, they should establish shared principles, minimum expectations, common terminology and recommended procedures. Participating organisations should then be able to adapt implementation to local needs, provided that they remain consistent with the overall objectives of sustainable and digital viticulture.

The need for a shared framework is reinforced by research on collaborative sustainability initiatives in the wine sector. A case study of the Prosecco Sustainability Project found that large and heterogeneous groups of grape and wine producers can improve the implementation of sustainable management practices when collaboration is supported by structured activities, shared competences and a coordinating figure able to facilitate dialogue among stakeholders (Zanin et al., 2024).

This evidence supports the development of common STIV guidance that is sufficiently clear to create consistency across the network, while remaining flexible enough to account for regional differences in climate, grape varieties, water availability, farm size, production systems and access to technology.

Possible areas for common guidance include soil conservation, biodiversity, water efficiency, integrated pest management, climate adaptation, responsible use of inputs, energy management, waste reduction, worker safety, digital data collection, use of artificial intelligence tools, traceability and communication of sustainability performance.

The OIV recognises the diversity of vitivinicultural environments and production systems and allows flexibility in the procedures used to pursue sustainability. Its principles therefore support a common orientation combined with a context-sensitive approach to implementation (OIV, 2016).

Documented practice: applying a shared sustainability standard collectively

Equalitas provides a sector-specific example of common technical guidance that has been applied through a collective territorial initiative. Its standard addresses environmental, social and economic sustainability through verifiable requirements, good practices and measurable indicators. The framework covers vineyard and winery practices as well as issues such as workers, training, economic management and sustainability communication. The certification obtained by the Vino Nobile di Montepulciano denomination in May 2022 demonstrates that such a shared framework has been implemented beyond the level of a single enterprise (Equalitas, n.d., 2022; Consorzio del Vino Nobile di Montepulciano, n.d.).

The good-practice element is the availability of a common technical language and assessment structure through which participating organisations can demonstrate their sustainability commitments. The documented result is collective certification against a defined standard, rather than proof that one uniform agronomic solution is suitable for every vineyard. The OIV principles provide a complementary basis for adaptation: they recognise differences among territories, enterprises and production systems and allow flexibility in the procedures used to pursue sustainability objectives (OIV, 2016).

For transfer to other contexts, the distinction between shared objectives and locally appropriate implementation is essential. A common framework can establish consistency in what is assessed while implementation remains sensitive to environmental, social and economic conditions. The Montepulciano case documents the application of a shared standard; the OIV resolution provides the justification for context-sensitive implementation.

Recommended cooperation actions:

- Develop a concise STIV technical handbook or protocol.
- Define common principles applicable to all participating organisations.
- Prepare optional thematic modules for specific regional or technical contexts.
- Develop templates for self-assessment, action planning and reporting.
- Review technical guidance regularly in light of research, regulatory developments and network experience.
- Allow justified local adaptation where common measures are not technically, economically or environmentally appropriate.

5.7. Network coordination, governance and long-term continuity

A sixth essential practice is the creation of a clear coordination and governance structure. Cooperation initiatives often lose momentum when they rely exclusively on informal and voluntary contact. A network does not necessarily require a complex administrative structure, but it does need defined responsibilities, communication channels, decision-making procedures and a shared work plan.

The STIV network should identify a coordinating body or lead organisation responsible for convening meetings, maintaining the shared communication platform, collecting agreed information, facilitating contact among participants and monitoring the implementation of common activities. Participating organisations should appoint a contact person responsible for internal coordination and communication with the network.

Coordination is not only an administrative function; it is a central condition for maintaining participation, trust and continuity over time. Collaborative sustainability initiatives are more likely to achieve broad uptake when a coordinating actor supports communication, facilitates dialogue, helps translate common objectives into practical activities and creates opportunities for producers to access technical expertise (Zanin et al., 2024).

The role of the coordinator should therefore include facilitating exchanges, supporting common planning, monitoring participation, managing agreed data-governance arrangements, identifying training needs and maintaining links with research institutions, VET providers and relevant public bodies.

A medium-term work plan should identify priority themes, planned training activities, technical meetings, monitoring exercises, possible pilot actions and expected outputs. The work plan should remain flexible enough to respond to emerging challenges, such as unusual

climatic events, new disease pressure, regulatory changes or new technological opportunities.

The OIV sustainability principles support collective action, stakeholder engagement, the development of objectives and the assessment of progress as part of a continuous-improvement approach (OIV, 2016)

The European wine sector also provides formal examples of collective organisation through producer organisations and interbranch organisations. These structures can carry out joint activities, including quality control, processing, distribution, knowledge improvement and adaptation of production to market needs, while remaining subject to competition rules and applicable European Union legislation (Šajn, 2023).

Documented practice: facilitated networks and enduring knowledge resources

WINETWORK provides a documented example of coordination serving a knowledge-exchange function rather than merely an administrative one. Its cooperation structure linked regional facilitator agents, technical working groups and scientific working groups. The final report identifies the facilitator-agent profile as crucial to connecting research and practice and reports that the project established a network of professionals exchanging knowledge on the two targeted diseases. The CORDIS results catalogue also includes a *Network handbook*, a *Strategy for sustainability of WINETWORK*, and a *Future research agenda for the network*, showing that governance and continuity were addressed through dedicated project outputs (European Commission, CORDIS, 2017, 2022)

At project completion, the knowledge reservoir contained more than 531 documents, with free and easy access identified in the final report as a mechanism for sustaining the knowledge produced. This supports the value of accessible shared resources as one element of continuity. It does not establish that all network relationships or activities remained operational over the subsequent years; that would require post-project evidence. The transferable lesson is that continuity should encompass both relationships among participants and the accessibility of collective knowledge.

A complementary example of established inter-organisational cooperation is reported by Richter and Hanf (2021). Their qualitative study was based on interviews conducted in July–August 2020 with 13 representatives of the management of German wine cooperatives and four representatives of cooperative associations. Some interviewed cooperative managers participated in WeinAllianz GmbH, a collaboration of 14 businesses, including cooperatives and wine estates from different wine-growing regions, sharing a joint sales force with the aim of reducing costs. This documents a concrete cooperation arrangement supported by a shared service and a clear economic purpose, although the study does not quantify the resulting savings.

Recommended cooperation actions:

- Designate a coordinating organisation or coordination group.
- Establish clear roles and responsibilities for network members.
- Require each participating organisation to appoint a contact person.
- Prepare an annual or multiannual cooperation work plan.

- Use shared digital tools for communication, documents, training resources and agreed data exchange.
- Organise periodic reviews of activities, participation and results.
- Develop a continuity strategy for the network beyond the initial STIV project period.

5.8. Key conditions for effective and transferable cooperation

The practices identified in this chapter indicate that effective cooperation is not determined primarily by the number of organisations involved. More important are the quality of participation, the practical relevance of activities, trust among participants and the ability of the network to transform shared knowledge into real action.

For the STIV Cooperation Protocol, effective and transferable cooperation should be based on the following conditions:

- Cooperation should address common and clearly identified technical, environmental, social or economic needs.
- Activities should produce practical value for participating organisations.
- Knowledge exchange should combine practical experience, scientific evidence and advisory support.
- Training should include field-based learning and real operational examples.
- Data collection should remain proportionate, relevant and feasible.
- Common indicators should be sufficiently harmonised to allow meaningful comparison and collective learning.
- Data governance should protect confidentiality and commercial sensitivity.
- Technical guidance should provide common direction while allowing justified local adaptation.
- Coordination responsibilities should be clearly defined.
- Participation should be followed by review, feedback and improvement actions.
- Sustainability should be understood as an integrated concept including environmental, social, economic and cultural dimensions.
- The network should promote continuous improvement rather than static compliance.

Table - Transferable Cooperation Practices for the STIV Network

The following table summarises the main cooperation practices identified in this chapter and outlines their potential application within the STIV network, together with the expected practical outputs. These practices provide an adaptable framework for strengthening transnational cooperation, knowledge exchange and the sustainable and digital transition of European viticulture.

Good Cooperation Practice	Application within the STIV Network	Expected Practical Outputs

1. Structured peer-to-peer knowledge exchange	Organisation of thematic meetings, peer-learning sessions and working groups to share experiences, challenges and innovative solutions among wine producers and stakeholders.	Meeting summaries, shared good practices, technical insights and lessons learned.
2. Vineyard demonstrations, winery visits and practical training	Organisation of field visits, practical demonstrations and experiential learning activities to facilitate the exchange and adaptation of sustainable and innovative viticulture practices.	Demonstration reports, technical factsheets, training materials and participant feedback.
3. Shared monitoring protocols and responsible data exchange	Adoption of common indicators, harmonised monitoring templates and agreed procedures for collecting and sharing relevant environmental, technical and operational information.	Common monitoring templates, comparable datasets, aggregated monitoring reports and shared findings.
4. Cooperation with research institutions, VET providers and advisory services	Collaboration between wine producers, researchers, educators and technical experts to identify skills gaps, address operational challenges and develop relevant training and innovation activities.	Joint training initiatives, identified research priorities, technical recommendations and adapted educational resources.

5. Common technical guidance and adaptable implementation tools	Development and use of shared sustainability principles, practical guidelines and implementation tools that can be adapted to different regional and organisational contexts.	Technical guidelines, self-assessment tools, implementation checklists and locally adapted action plans.
6. Network coordination, governance and long-term continuity	Establishment of clear coordination responsibilities, annual cooperation meetings, shared planning procedures and mechanisms for monitoring collaboration beyond the STIV project.	Annual cooperation plans, meeting minutes, activity reports, updated membership records and documented follow-up actions.

These cooperation practices are intended to provide a flexible and transferable framework rather than impose uniform operational requirements. Their implementation should reflect the needs, capacities and territorial contexts of participating organisations, while promoting mutual learning, shared responsibility and continuous improvement.

6. Standards for Future Participating Organisations

6.1. Purpose and scope of the standards

The standards set out in this chapter define the minimum requirements and commitments expected from organisations wishing to join the STIV Cooperation Protocol in the future. They are intended to ensure that participating organisations can contribute meaningfully to the network and benefit from common activities, knowledge exchange, technical support and collaborative learning.

These standards do not constitute a certification scheme and should not be interpreted as a formal conformity-assessment system. They are designed as a common participation framework based on shared commitments, transparency, mutual trust and continuous improvement.

The standards are designed to support meaningful participation rather than to impose uniform practices. This distinction is important because wine-sector organisations differ significantly in size, production model, access to technical support, digital capacity and financial resources. Evidence from sustainability partnerships suggests that participation and adoption are more likely when organisations can identify concrete practical benefits and when requirements are supported by accessible knowledge, trusted networks and appropriate technical assistance (Hillis et al., 2018).

The standards should be implemented proportionately, taking into account the type, size, role, resources, technical capacity and local context of each participating organisation. New organisations may require an initial adaptation period in order to appoint a contact person, establish data-collection procedures, participate in introductory training and prepare an initial improvement plan. The approach is consistent with the OIV framework, which promotes planning, assessment, stakeholder engagement, measurable objectives, monitoring and the "plan, do, check, adjust" cycle as part of a continuous sustainability process (OIV, 2020).

6.2. Standard 1 - Organisational capacity and network responsibilities

This standard translates the coordination and governance practices identified in Section 5.7 into responsibilities for individual participating organisations.

Minimum requirements:

- Relevant organisational role. The organisation shall be legally established and active in viticulture, winemaking, wine-sector services, research, vocational education and training, advisory activities, technology development or another relevant area of the vitivinicultural value chain.
- Formal acceptance of the protocol. The organisation shall accept the objectives, participation standards and operating rules of the STIV Cooperation Protocol.
- Designated contact person. The organisation shall appoint a representative responsible for communication with the network, internal coordination and transmission of agreed information.
- Minimum resource allocation. The organisation shall identify the time and internal resources it can reasonably allocate to agreed meetings, training, knowledge exchanges, monitoring and review activities.
- Contribution to common planning. The organisation shall communicate its relevant needs and priorities and agree on a feasible contribution to the network work plan.
- Respect for governance arrangements. The organisation shall follow agreed communication channels, decision-making procedures and rules for using shared resources.
- Compliance with applicable legislation. The organisation shall comply with the legal obligations applicable to its activities, including relevant environmental, labour, health and safety, food safety, traceability and data-protection requirements.

Minimum evidence of implementation: an organisational profile, formal acceptance of the protocol, designation of a contact person and a brief participation commitment.

The STIV coordination structure shall provide clear operating rules, accessible communication channels and a shared work plan. Individual participants shall not be expected to establish or maintain the network's coordination system independently.

6.3. Standard 2 - Cooperation and knowledge sharing

This standard translates structured peer-to-peer exchange, as described in Section 5.2, into a commitment to active and reciprocal participation.

Minimum requirements:

- Participation in relevant exchanges. The organisation shall take part in thematic meetings, working groups or other knowledge-sharing activities according to an agreed participation schedule.
- Contribution of practical knowledge. The organisation shall contribute relevant experience, observations, challenges or lessons learned within its area of competence, subject to confidentiality arrangements.
- Identification of operational needs. The organisation shall help identify practical problems, technical barriers or unresolved questions that may be addressed through collective activities.
- Discussion of implementation conditions. When presenting a practice, the organisation shall explain relevant local conditions, resource needs and operational limitations, where known.

- Respectful and transparent cooperation. The organisation shall observe principles of mutual respect, non-discrimination, responsible communication and recognition of other participants' contributions.
- Responsible use of shared information. The organisation shall respect intellectual-property rights, confidentiality commitments and commercial sensitivity.

Participants are encouraged to share both successful practices and unsuccessful trials where these offer useful lessons. They shall not be required to disclose protected or commercially sensitive information without their agreement.

Minimum evidence of implementation: participation records and a documented contribution, such as a practical observation, case study, technical question or account of lessons learned.

The coordination structure shall facilitate exchanges, prepare concise summaries and ensure that relevant findings and unresolved questions are communicated to the wider network.

6.4 Standard 3 - Training and practical learning

This standard translates the demonstrations, visits and practical-training approach described in Section 5.3 into commitments to competence development and operational learning.

Minimum requirements:

- Identification of competence needs. The organisation shall identify the technical, green and digital skills needed to fulfil its network responsibilities and implement relevant practices.
- Participation in introductory activities. Designated representatives shall complete the introductory activities agreed for new participants.
- Participation in relevant learning activities. The organisation shall enable appropriate staff, members or representatives to attend agreed training, demonstrations, technical workshops or vineyard and winery visits.
- Assessment of practical relevance. Following relevant activities, the organisation shall consider whether the practices presented can be adopted, adapted or tested in its own context.
- Internal knowledge transfer. Relevant learning shall be communicated to the people responsible for implementation within the organisation.
- Feedback and follow-up. The organisation shall provide proportionate feedback on the usefulness, feasibility and possible application of the learning received.

Hosting visits, contributing demonstration sites, preparing learning materials and participating in pilot actions are encouraged where suitable resources and facilities are available. Hosting shall not be a condition of membership for every organisation.

Minimum evidence of implementation: a brief record of training needs, participation in relevant activities and follow-up feedback identifying potential applications or barriers.

The coordination structure shall ensure that practical learning includes discussion of implementation requirements, costs, expected benefits, risks and adaptation options, rather than presentation of a practice alone.

6.5. Standard 4 - Data collection, sharing and monitoring

This standard translates the shared monitoring and responsible data-exchange practices identified in Section 5.4 into a proportionate reporting commitment.

Minimum requirements:

- Agreement on a minimum dataset. The organisation shall agree with the network on a limited set of indicators relevant to its activities and the objectives of the cooperation.
- Use of common definitions. The organisation shall use the agreed terminology, measurement units, reporting periods, templates and collection methods.
- Designated reporting responsibility. The organisation shall identify the person responsible for coordinating data collection and submission.

- Data quality and traceability. Submitted information shall be supported, where appropriate, by records, observations or recognised measurement methods. Estimates, missing information and methodological limitations shall be identified.
- Timely reporting. The organisation shall provide agreed information according to the reporting schedule or communicate difficulties and agree on corrective steps.
- Compliance with data-governance arrangements. The organisation shall respect the agreed rules on ownership, access, storage, confidentiality, aggregation, publication and permitted uses.
- Contribution to interpretation. Where relevant, the organisation shall provide contextual information needed to understand results and avoid misleading comparisons.

The principle of "data minimisation with practical value" established in Section 5.4 shall apply. Participants shall not be required to collect information that is irrelevant to their role, unnecessary for common objectives or disproportionate to the agreed scope of participation.

Minimum evidence of implementation: an agreed monitoring template, identification of reporting responsibility and submission of the first dataset within the agreed adaptation period.

Before information is exchanged, the coordination structure shall establish the applicable data-governance arrangements. Commercially sensitive information shall not be disclosed without the explicit agreement of the organisation concerned.

Aggregate or anonymised reporting shall be used where appropriate and in accordance with these arrangements.

6.6. Standard 5 – Engagement with research, training and advisory support

This standard translates the reciprocal relationships described in Section 5.5 into a commitment to connect operational needs with relevant expertise.

Minimum requirements:

- Communication of technical and training needs. The organisation shall identify questions, competence gaps or implementation barriers for which research, training or advisory support may be useful.
- Contribution to priority-setting. Within its area of competence, the organisation shall contribute to consultations on research questions, training priorities or technical-support needs.
- Engagement with relevant expertise. Where such support forms part of agreed activities, the organisation shall cooperate with the researchers, VET providers, advisors or other specialists involved.
- Feedback on proposed solutions. The organisation shall provide practical feedback on the relevance, feasibility and operational implications of recommendations or

innovations.
- Contribution to accessible guidance. Where appropriate, the organisation shall help ensure that technical findings are understandable and usable by practitioners.

Participation in experimental trials or pilot activities shall depend on suitability, resources and separately agreed responsibilities. Joining the network shall not require every organisation to establish its own formal partnership with a university, laboratory or VET provider.

Minimum evidence of implementation: a documented technical or training need and participation in a relevant consultation, advisory exchange or feedback activity.

The coordination structure shall facilitate access to appropriate knowledge providers and support the translation of specialist knowledge into practical guidance.

6.7. Standard 6 - Application of common guidance and sustainability commitments

This standard translates the shared but adaptable technical framework described in Section 5.6 into implementation requirements.

Minimum requirements:

- Commitment to sustainable practices. The organisation shall commit to progressive improvement in the environmental, social and economic dimensions of its activities, recognising relevant cultural and territorial conditions.
- Assessment of applicability. Within the agreed adaptation period, the organisation shall identify which common principles, procedures and thematic guidance are relevant to its role.
- Application of minimum procedures. The organisation shall apply the relevant minimum procedures adopted by the network or agree on an implementation timetable.
- Environmental and social responsibilities. The organisation shall respect applicable obligations concerning environmental protection, working conditions, occupational health and safety and non-discrimination, and identify relevant improvement opportunities.
- Justified local adaptation. Where a common measure is unsuitable because of local agronomic, climatic, technical, economic or legal conditions, the organisation shall document the reason and identify an alternative consistent with the protocol's objectives.
- Responsible use of digital tools. Where digital monitoring, decision-support systems or artificial intelligence applications are introduced through agreed activities, the organisation shall ensure appropriate user information or training and compliance with the network's data-governance rules.

- Use of common implementation tools. The organisation shall use agreed self-assessment, action-planning and reporting templates where applicable.

Local adaptation shall not justify non-compliance with legislation or disregard for essential participation commitments. Membership shall not require the purchase of particular technologies unless this has been explicitly agreed for a specific activity.

Minimum evidence of implementation: an assessment of applicable guidance, an implementation timetable where needed and documentation of any significant local adaptations.

The coordination structure shall maintain concise common guidance and distinguish mandatory minimum procedures from optional thematic recommendations.

6.8. Cross-cutting requirement - Continuous improvement and review of results

Continuous improvement applies to all six standards and reflects the conditions identified in Section 5.8. Participation shall therefore include a practical cycle of assessment, action, feedback and review.

Minimum requirements:

- Initial self-assessment. The organisation shall assess its current practices, participation capacity and improvement needs within the agreed adaptation period.
- Identification of priorities. The organisation shall select realistic priorities informed by its needs, monitoring results, training outcomes and peer exchanges.
- Initial improvement plan. The organisation shall define at least one relevant improvement action, identifying a responsible person, an indicative timetable and an appropriate means of assessing progress.
- Implementation and documentation. The organisation shall progressively implement agreed actions and record significant results, barriers or adjustments.
- Periodic review. The organisation shall review progress with the network at agreed intervals and update its priorities where necessary.
- Accurate external communication. Claims concerning participation, practices or results shall reflect available evidence and shall not imply certification or verified impacts that have not been established.

Improvement actions may concern vineyard or winery practices, resource management, digital skills, data quality, training, internal coordination or knowledge sharing, depending on the organisation's role.

Minimum evidence of implementation: an initial self-assessment, a proportionate improvement plan and periodic progress updates.

Review shall distinguish between participation outputs, changes in organisational practices and measured outcomes. Attendance at training, submission of data or preparation of guidance shall not, by themselves, be presented as proof of environmental or economic improvement.

6.9. Admission, implementation and periodic review

New organisations wishing to join the STIV Cooperation Network shall submit a signed accession form confirming their acceptance of the Protocol and its minimum participation standards. Following admission, each organisation shall designate a contact person and complete an initial self-assessment and participation plan within an indicative period of six months, unless a different timetable is agreed with the coordination structure. The coordination structure shall maintain an updated register of signatory organisations, recording their contact persons, date of accession, relevant areas of expertise and agreed participation commitments. Admission procedures shall remain accessible and proportionate to the size, nature and operational capacity of each organisation.

Admission phase

The applicant shall:

- Demonstrate a relevant organisational role.
- Formally accept the protocol and its operating rules.
- Appoint a contact person.
- Confirm its capacity to contribute to agreed activities.
- Accept applicable cooperation, confidentiality and data-governance commitments.

The coordination structure shall assess these entry requirements and agree with the applicant on the scope of participation, the adaptation period and any initial support needs.

Initial adaptation phase

Within the agreed period, the organisation shall:

- Complete introductory activities.
- Conduct its initial self-assessment.
- Identify applicable technical guidance and training needs.
- Agree on its monitoring dataset and reporting arrangements.
- Prepare its initial participation and improvement plan.

Milestones shall be explicit and proportionate to the organisation's role and resources.

Ongoing participation phase

The organisation shall fulfil its agreed commitments concerning knowledge exchange, learning activities, technical cooperation, monitoring and improvement actions.

The coordination structure shall provide facilitation, shared tools and access to relevant support within the network's available resources.

Periodic review phase

Reviews shall consider participation, fulfilment of commitments, reporting quality, progress on improvement actions and continuing support needs.

Where a commitment is not fulfilled, the coordination structure shall first clarify the reasons and agree on proportionate corrective actions and deadlines. Persistent failure to meet essential requirements shall be addressed through transparent procedures established in the network's operating rules, including a review of continued participation where necessary.

The standards shall also be reviewed periodically in light of network experience, changes in applicable legislation, emerging technical needs and available resources.

Their purpose is to preserve the practical cooperation model developed in Chapter 5: shared objectives, reciprocal learning, responsible information exchange, locally appropriate implementation and sustained improvement, rather than uniform solutions or static compliance.

7. Governance and Operational Framework

The STIV Cooperation Protocol is intended to support a flexible and long-term cooperation network among organisations operating in the viticulture sector. Its governance model is therefore designed to facilitate cooperation, ensure continuity of communication and support the implementation of joint activities without creating a new permanent institutional structure.

Participating organisations retain their legal, organisational and operational autonomy. Participation in the STIV network is voluntary and is formalised through adherence to the Memorandum of Understanding associated with this Protocol.

The governance framework should remain proportionate to the scope and resources of the network and should facilitate, rather than increase, the administrative burden placed on participating organisations.

7.1. Governance principles

The governance of the STIV cooperation network is based on the following principles:

- **Equal collaboration**
  All participating organisations are recognised as contributors to the network, regardless of their size, legal form, geographical location or level of technical development.
- **Transparency**

Relevant information concerning network activities, decisions, opportunities and common initiatives should be communicated clearly and made accessible to participating organisations.

- **Voluntary participation**
  Participation in the network and in individual cooperation activities remains voluntary and should reflect the capacities, interests and organisational priorities of each member.
- **Knowledge sharing**
  The network promotes the exchange of experiences, practices, technical knowledge, training resources and non-confidential information that may contribute to the sustainable and digital development of the viticulture sector.
- **Mutual responsibility**
  Participating organisations are expected to contribute actively to the network within their capacities, supporting constructive cooperation and the achievement of common objectives.
- **Respect for territorial specificities**
  The network recognises that viticulture operates in diverse environmental, climatic, social, economic and regulatory contexts. Common approaches should therefore allow appropriate adaptation to local conditions.
- **Proportionality**
  Participation requirements, monitoring activities and cooperation mechanisms should remain proportionate to the size, role, resources and technical capacity of each organisation.
- **Continuous improvement**
  The functioning of the network and its cooperation mechanisms should be periodically reviewed and adapted on the basis of experience, emerging needs, technological developments and changes affecting the viticulture sector.

7.2. Roles of participating organisations

Participating organisations

Participating organisations form the core of the STIV cooperation network. Depending on their nature and expertise, they may include winegrowers, wineries, cooperatives, producer organisations, agricultural associations, VET providers, research institutions, universities, agricultural advisors, technology providers, public authorities and other relevant actors within the viticulture value chain.

Within the network, participating organisations are expected, where relevant and feasible, to:

- take part in cooperation, training and knowledge-exchange activities;
- share experiences, practices and lessons learned;
- contribute to peer-learning and capacity-building activities;
- make available agreed, relevant and non-confidential information when required for joint activities;

- identify emerging needs, challenges and opportunities that may be addressed collectively;
- support the dissemination and appropriate use of STIV results;
- provide feedback on network activities and contribute to their continuous improvement.

Participation does not require organisations to implement identical practices. Each organisation may adapt the knowledge, tools and approaches exchanged through the network to its own operational and territorial context.

Coordinating organisation or coordination group

The network should identify a coordinating organisation or, where appropriate, a small coordination group responsible for facilitating communication and maintaining the operational continuity of the cooperation framework.

The coordinating function does not constitute a separate legal entity and does not have unilateral decision-making authority over participating organisations.

Its main functions include:

- maintaining an updated list of participating organisations and designated contact persons;
- facilitating communication among members;
- convening network meetings and other common activities;
- circulating relevant information, opportunities and shared documentation;
- collecting requests from organisations interested in joining the network;
- supporting the integration of new participating organisations;
- facilitating the implementation of agreed cooperation activities;
- coordinating the periodic review of the Protocol and its operational mechanisms;
- maintaining the continuity of the network beyond the formal duration of the STIV project.

During the initial implementation of the Protocol, this coordination function may be ensured by STIV project partners. Its continuation may subsequently be reviewed according to the level of participation, available resources and needs of the network.

Designated contact persons

Each participating organisation should identify at least one contact person responsible for maintaining communication with the network.

The contact person should facilitate the circulation of information within the organisation, coordinate participation in relevant activities and communicate organisational needs, opportunities or constraints to the network coordinator.

This role is intended to ensure continuity even when different staff members participate in

individual activities.

7.3. Decision-making

Decision-making within the STIV Cooperation Protocol should be simple, transparent and proportionate to the nature of the decision. The objective is to encourage shared ownership of the network while avoiding unnecessarily complex procedures.

The network should give priority to dialogue, consultation and consensus. Decisions concerning the strategic development of the network should preferably be taken by consensus among participating organisations.

Consensus should be understood as the absence of a reasoned objection that would prevent the adoption of a proposal. It does not necessarily require that every participating organisation express identical preferences. The coordinating organisation or coordination group should make reasonable efforts to identify concerns, facilitate discussion and seek solutions that can be accepted by all participants.

A distinction should be made between operational decisions and strategic decisions.

Operational decisions

Operational decisions may concern:

- The date, format and agenda of meetings.
- The organisation of technical workshops, training activities or field visits.
- The selection of priority themes for knowledge exchange.
- The use of communication tools and shared digital platforms.
- The format of non-sensitive monitoring templates.
- The preparation and dissemination of technical materials.
- The scheduling of reviews, consultations and network activities.

These decisions should normally be reached through consultation. Where consensus cannot be achieved within a reasonable timeframe, a simple majority of the participating organisations responding to the consultation may be used.

Strategic decisions

Strategic decisions may concern:

- A substantial revision of the objectives or scope of the STIV Cooperation Protocol.
- Amendments to the governance principles.
- Amendments to the minimum requirements and commitments for participating organisations.
- Changes to data-governance principles or confidentiality arrangements.
- Changes to the overall coordination model.

- The inclusion of new categories of participating organisations.
- The adoption of a long-term continuity strategy beyond the initial project period.
- The approval of common principles that may affect the responsibilities or commitments of participating organisations.

Strategic decisions should preferably be adopted by consensus.

Relevant decisions should be documented in a simple and proportionate manner and communicated to participating organisations.

7.4. Annual Cooperation Cycle and Long-term Continuity

The STIV Cooperation Protocol is designed to support cooperation beyond the formal end of the project.

To maintain the network active and to ensure continuity of the relationships established through STIV, the signatory organisations will be invited to participate in at least one online cooperation meeting per year for a minimum period of five years following the end of the STIV project.

The annual meeting should serve as the main common review and planning moment of the network.

During the meeting, participating organisations may:

- report on activities implemented using or building on STIV results;
- share relevant practices, experiences and lessons learned;
- present emerging needs or challenges affecting their territories;
- discuss developments related to sustainable and digital viticulture;
- identify possible training, peer-learning, demonstration or experimentation activities;
- review the use and relevance of STIV tools and training materials;
- identify opportunities for further cooperation;
- agree on priorities for the following cooperation period.

A short summary of the annual meeting should record the organisations participating, the main issues discussed, relevant activities reported and any follow-up actions agreed.

Between annual meetings, communication may continue through digital channels, online exchanges and bilateral or multilateral cooperation among interested organisations.

The continuity of the network does not require all organisations to participate in every activity. Cooperation may be activated according to specific interests, needs and available resources, while maintaining the common framework established by the Protocol and the Memorandum of Understanding.

8. Cooperation Mechanisms and Activities

The cooperation mechanisms described in this chapter translate the good practices identified in Chapter 5 into practical forms of collaboration within the STIV network.

They are not intended to create rigid or mandatory activity requirements. Rather, they provide a common operational framework through which participating organisations can implement cooperation activities according to their needs, interests, resources and territorial contexts.

Activities may involve the entire network or smaller groups of organisations sharing a specific interest or challenge.

8.1. Knowledge Exchange

Knowledge exchange constitutes a core mechanism of the STIV network and supports the circulation of practical experience, technical knowledge and lessons learned among participating organisations.

Knowledge-exchange activities may include:

- exchange of good practices;
- thematic online meetings;
- discussion of case studies;
- peer-to-peer learning sessions;
- thematic working groups;
- exchange of technical materials and guidance;
- sharing of relevant project, research or field experiences;
- creation and maintenance of a shared repository of useful resources.

The exchange should be reciprocal. Winegrowers and wineries can contribute practical and operational knowledge, while research institutions, VET providers, agricultural advisors and technology organisations may contribute scientific, educational or technical expertise.

A shared digital repository may be used to collect, where appropriate:

- STIV training materials;
- practical guides and factsheets;
- case studies;
- presentations;
- methodological tools;
- relevant recordings;
- templates;
- examples of practices tested by participating organisations.

Materials should be shared in accordance with applicable intellectual-property, confidentiality and data-protection requirements.

Knowledge-exchange topics should respond to the interests and needs identified by participating organisations and may include sustainable vineyard management, climate adaptation, soil and water management, biodiversity, digitalisation, artificial intelligence, precision viticulture, energy efficiency and new business models.

8.2. Training and Capacity Building

Training and capacity building should support participating organisations in developing and updating the competences required for the sustainable, digital, social and economic transition of the viticulture sector.

The training resources developed within STIV provide an initial common basis for these activities.

Capacity-building activities may include:

- use of the STIV training modules;
- workshops and thematic training sessions;
- training exchanges between participating organisations;
- training for winegrowers and other sector professionals;
- introduction of new organisations and producers to STIV approaches and tools;
- peer-training activities;
- practical sessions connected to field demonstrations or experimentation;
- periodic updating or adaptation of training materials.

Training activities should be adapted to the needs and level of experience of participants.

Where useful, research institutions, VET organisations, technical advisors, experienced producers and technology providers may contribute as trainers or facilitators.

Over time, training content may be updated to reflect changes in technology, sustainability practices, regulation, climate conditions and emerging competence needs.

Updates to STIV training materials should preserve the main learning objectives and competence framework while allowing adaptation to different territorial and professional contexts.

8.3. Peer Visits and Demonstration Activities

Peer visits and demonstration activities provide opportunities to observe practices, technologies and organisational approaches directly in real vineyard and winery contexts.

They may include:

- vineyard visits;
- winery visits;
- study visits;
- demonstration days;
- exchange visits between wine-producing regions;
- practical demonstrations of equipment or digital technologies;
- visits to research, training or innovation facilities.

These activities should enable participants to examine how practices are implemented under real operating conditions and to discuss directly with the organisations applying them.

For example, a vineyard visit may focus on soil-management practices, irrigation systems, biodiversity measures, sensors, precision-viticulture technologies or climate-adaptation strategies.

A demonstration activity may combine observation of the practice with discussion of:

- implementation conditions;
- technical requirements;
- expected benefits;
- possible limitations;
- costs and resource requirements;
- potential adaptation to other territories.

Cross-regional visits are particularly useful when participating organisations face similar challenges under different climatic, economic or organisational conditions.

The objective is not to replicate practices automatically, but to facilitate informed transfer and adaptation.

8.4. Joint Experimentation and Innovation

The STIV network may also provide a framework for organisations interested in testing innovative practices, technologies or solutions jointly.

Joint experimentation may concern, for example:

- artificial-intelligence applications;
- sensors and monitoring systems;
- precision-viticulture tools;
- remote-sensing technologies;
- decision-support systems;
- innovative water-management practices;
- soil-management approaches;
- biodiversity measures;
- energy-efficiency solutions;

- new sustainable production practices;
- new products or business models.

Experimentation may take place within one or more participating territories and may involve winegrowers, research institutions, VET providers, technical advisors or technology developers.

Where organisations in different regions test comparable practices or technologies, the network may facilitate comparison of experiences and results.

Joint experimentation should remain proportionate to the capacities of participating organisations and should not require members to make investments or adopt technologies that are not relevant to their activities.

Participating organisations should be encouraged to share not only positive results but also implementation difficulties, limitations and unsuccessful trials, as these can provide useful learning for other network members.

Research and technical partners may support participating organisations in defining testing methods, interpreting results or adapting technologies to local conditions.

8.5. Sharing of Data and Monitoring Results

The exchange of data and monitoring results may support collective learning, comparison of experiences and evaluation of innovative or sustainable practices.

However, participation in the STIV network does not imply an obligation to disclose confidential, commercially sensitive or otherwise protected organisational data.

Any information shared within the network should therefore be agreed, relevant and non-confidential and should comply with applicable data-protection, confidentiality and intellectual-property requirements.

Where useful for specific cooperation activities, participating organisations may agree to share aggregated or anonymised information relating to areas such as:

- water consumption or water-management practices;
- use of agricultural inputs;
- energy consumption;
- phytosanitary challenges;
- soil or biodiversity indicators;
- uptake of digital tools;
- results of pilot activities or experimentation;
- environmental indicators;
- participation in training or cooperation activities.

The type of information collected should depend on the objective of the specific cooperation activity. Data collection should remain proportionate and should avoid unnecessary administrative burdens.

Before any structured data-sharing exercise, participating organisations should agree on:

- the purpose of the data collection;
- the information to be shared;
- the format and level of aggregation;
- access to the information;
- confidentiality requirements;
- how the results may be used or disseminated.

Whenever appropriate, results should be presented in aggregated or anonymised form.

Monitoring should primarily serve learning and improvement within the network rather than compliance control. The objective is to help participating organisations understand the results of tested approaches, identify relevant trends and support evidence-informed discussion and cooperation.

8.6 Operational Planning and Review of Cooperation Activities

The activities described in this chapter may be organised according to the priorities identified by participating organisations during the annual cooperation cycle.

A simple annual cooperation plan may be prepared following the annual network meeting, identifying the activities that participating organisations intend to undertake during the following period.

The plan may include, where relevant:

- priority topics;
- planned knowledge-exchange activities;
- training initiatives;
- peer visits or demonstration activities;
- possible joint experimentation;
- agreed monitoring or data-sharing activities;
- organisations interested in participating;
- indicative timing.

Participation in individual activities remains voluntary and dependent on the interests, capacities and resources of each organisation.

At the following annual meeting, participating organisations should have the opportunity to review the activities undertaken, share relevant results and identify any adjustments needed for the subsequent cooperation cycle.

This annual planning and review mechanism allows the STIV network to remain active while maintaining a flexible structure capable of adapting to changing needs and opportunities in the European viticulture sector.

8.7 Monitoring and Evaluation of Cooperation Activities

The STIV Cooperation Network shall adopt a simple monitoring framework to assess the continuity, relevance and effectiveness of its activities.

Monitoring shall focus on participation, implementation of cooperation commitments, use of STIV educational resources, knowledge exchange and development of new collaborative initiatives.

The coordinating organisation or coordination group shall collect and consolidate the relevant information through the annual reporting process.

The network shall monitor the following minimum indicators:

- Number of organisations formally adhering to the Protocol;
- Number of annual cooperation meetings organised;
- Number of signatory organisations participating in the annual cooperation and reporting process;
- Number of cooperation, training or knowledge-sharing activities reported;
- Number of organisations reporting the use or adaptation of STIV tools and resources;
- Number of new collaborative initiatives developed among network members;
- Level of satisfaction with the cooperation framework.

Results shall be reviewed during the annual cooperation meeting and used to identify improvement actions, emerging needs and priorities for future activities.

The monitoring framework shall remain proportionate and shall distinguish between activities delivered, changes in organisational practices and demonstrable impacts.

9. Implementation and Formalisation of the Cooperation Framework

The cooperation strategy outlined in this document provides the strategic and operational framework for strengthening long-term collaboration among European wine producers and relevant stakeholders.

The formal commitments, roles, responsibilities, governance arrangements and procedures for implementing this cooperation framework are established in the **STIV Cooperation Protocol**, provided as a separate annex to this document (**Annex I**).

The Protocol constitutes the formal instrument through which participating organisations express their commitment to the shared objectives and cooperation principles developed within the STIV project, including the continuity of transnational cooperation for at least five

years following project completion.

Together, the Cooperation Strategy and its accompanying Protocol establish a coherent framework for promoting sustainable and digital innovation, mutual learning and long-term collaboration within the European viticulture sector.

References and bibliography

Alessandri, G., Daddi, T., & Iraldo, F. (2024). Environmental sustainability in the wine industry: A literature review. *Cleaner Production Letters*, *7*, 100067. https://doi.org/10.1016/j.clpl.2024.100067

Ashenfelter, O., & Storchmann, K. (2016). The economics of wine, weather, and climate change. *Review of Environmental Economics and Policy*, *10*(1). https://doi.org/10.1093/reep/rev018

Emerson, K., Nabatchi, T., & Balogh, S. (2012). An integrative framework for collaborative governance. *Journal of Public Administration Research and Theory*, *22*(1), 1–29. https://doi.org/10.1093/jopart/mur011

European Commission, CORDIS. (2017). *Periodic reporting for period 2 – WINETWORK: Network for the exchange and transfer of innovative knowledge between European wine-growing regions to increase the productivity and sustainability of the sector.* Horizon 2020, Grant Agreement No. 652601. https://cordis.europa.eu/project/id/652601/reporting

European Commission, CORDIS. (2022). *WINETWORK – Project results.* Horizon 2020, Grant Agreement No. 652601. https://cordis.europa.eu/project/id/652601/results

European Union. (2013). *Regulation (EU) No 1308/2013 of the European Parliament and of the Council of 17 December 2013 establishing a common organisation of the markets in agricultural products.* Official Journal of the European Union, L 347, 671–854. https://eur-lex.europa.eu/eli/reg/2013/1308/oj

Hillis, V., Lubell, M., & Hoffman, M. (2018). Sustainability partnerships and viticulture management in California. *Journal of Environmental Management*, *217*, 214–225. https://doi.org/10.1016/j.jenvman.2018.03.033

Hutchins, J., & Hueth, B. (2023). 100 years of data sovereignty: Cooperative data governance and innovation in US dairy. *Applied Economic Perspectives and Policy*. https://doi.org/10.1002/aepp.13339

International Organisation of Vine and Wine (OIV). (2016). *OIV general principles of sustainable vitiviniculture – Environmental, social, economic and cultural aspects* (Resolution OIV-CST 518-2016). https://www.oiv.int/node/3207

International Organisation of Vine and Wine (OIV). (2020). *OIV guide for the implementation of principles of sustainable vitiviniculture* (Resolution OIV-VITI 641-2020). https://www.oiv.int/public/medias/7601/oiv-viti-641-2020-en.pdf

Intergovernmental Panel on Climate Change (IPCC). (2021). *Climate change 2021: The physical science basis.* Cambridge University Press. https://doi.org/10.1017/9781009157896

Jones, G. V., & Davis, R. E. (2000). Climate influences on grapevine phenology, grape composition, and wine production and quality for Bordeaux, France. *American Journal of Enology and Viticulture*, *51*(3), 249–261. https://doi.org/10.5344/ajev.2000.51.3.249

Jouanjean, M.-A., Casalini, F., Wiseman, L., & Gray, E. (2020). *Issues around data governance in the digital transformation of agriculture: The farmers' perspective* (OECD Food, Agriculture and Fisheries Papers No. 146). OECD Publishing. https://doi.org/10.1787/53ecf2ab-en

Klerkx, L., Jakku, E., & Labarthe, P. (2019). A review of social science on digital agriculture, smart farming and agriculture 4.0: New contributions and a future research agenda. *NJAS: Wageningen Journal of Life Sciences*, *90–91*, 100315. https://doi.org/10.1016/j.njas.2019.100315

Mariani, A., & Vastola, A. (2015). Sustainable winegrowing: Current perspectives. *International Journal of Wine Research*, *7*, 37–48. https://doi.org/10.2147/IJWR.S68003

Masi, M., De Rosa, M., Vecchio, Y., Bartoli, L., & Adinolfi, F. (2022). The long way to innovation adoption: Insights from precision agriculture. *Agricultural and Food Economics*, *10*, 27. https://doi.org/10.1186/s40100-022-00236-5

Masson, J. E., Soustre-Gacougnolle, I., Perrin, M., Schmitt, C., Henaux, M., Jaugey, C., Teillet, E., Lollier, M., Lallemand, J.-F., Schermesser, F., & GIEE Westhalten. (2021). Transdisciplinary participatory-action-research from questions to actionable knowledge for sustainable viticulture development. *Humanities and Social Sciences Communications*, *8*, 24. https://doi.org/10.1057/s41599-020-00693-7

Organisation for Economic Co-operation and Development (OECD). (2021). *Making better policies for food systems*. OECD Publishing. https://doi.org/10.1787/ddfba4de-en

Richter, B., & Hanf, J. H. (2021). Sustainability as "value of cooperatives"—Can (wine) cooperatives use sustainability as a driver for a brand concept? *Sustainability*, *13*(22), 12344. https://doi.org/10.3390/su132212344

Santini, C., Cavicchi, A., & Casini, L. (2013). Sustainability in the wine industry: Key questions and research trends. *Agricultural and Food Economics*, *1*, 9. https://doi.org/10.1186/2193-7532-1-9

Sarri, D., Lombardo, S., Pagliai, A., Perna, C., Lisci, R., De Pascale, V., Rimediotti, M., Cencini, G., & Vieri, M. (2020). Smart farming introduction in wine farms: A systematic review and a new proposal. *Sustainability*, *12*(17), 7191. https://doi.org/10.3390/su12177191

Šajn, N. (2023). *The EU wine sector* (Briefing PE 751.399). European Parliamentary Research Service. https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2023)751399

Teixeira, R. da R. O., Arcuri, S., Cavicchi, A., Galli, F., Brunori, G., & Vergamini, D. (2023). Can alternative wine networks foster sustainable business model innovation and value creation? The case of organic and biodynamic wine in Tuscany. *Frontiers in Sustainable Food Systems*, *7*, 1241062. https://doi.org/10.3389/fsufs.2023.1241062

Wolfert, S., Ge, L., Verdouw, C., & Bogaardt, M.-J. (2017). Big data in smart farming – A review. *Agricultural Systems, 153*, 69–80. https://doi.org/10.1016/j.agsy.2017.01.023

Zanin, V., et al. (2024). Collaborative approach for achieving ambitious sustainability goals: The Prosecco Sustainability Project. *Sustainability, 16*(2), 583. https://doi.org/10.3390/su16020583