



# SPECIAL VITIVINICULTURE BOOKLET

JULY 2022



**OIV**

Dear Partners and Members,

The human diet is such that even though food is primarily intended to provide our organisms with the elements they need to live, some of the food we eat and drink is more for pleasure. Agricultural production from the vines is largely part of this context, even though it represents only 0.14% of the world's useful agricultural area (Spain, France, China and Italy together account for nearly 45% of the world's wine-growing area).

Wine production is characterized by its great resilience being planted on generally poor and degraded soils with a low rate of organic matter, which the vine is content to grow. But in the general context of climate change, wine production will have to continue to adapt in the years to come by working on the choice of grape varieties, the change in agricultural practices (in particular the reduction of tillage and the use of cover crops), the association with trees and/or photovoltaic panels, the reduction in the use of mineral fertilizers and agro-chemical products (even the so-called "natural" such as copper) in its fight against soil contamination, etc. But the vine will not only have to adapt, it can also contribute to mitigating climate change by storing carbon in the soil and above the ground.



*Paul Luu, Executive Secretary of the international "4 per 1000" Initiative*

This sector, characterized by privileged relation between consumers and producers, often also processors, associated with the culture, terroirs and traditions of a region and/or a country, seemed to us to be particularly interesting to consider in its most recent developments. When we signed a partnership agreement with the International Organisation of Vine and Wine last April, we collectively thought that a special section of the "4 per 1000" Initiative newsletter would be an appropriate way to pay tribute to the passionate producers involved in this sector and its evolution. This booklet, the fruit of this collaboration, has been released with the active participation of the Members and Partners of the Initiative's, to whom I pay tribute, and with the precious help of the OIV teams, both in terms of content and layout.

I would like to thank in particular Pau ROCA, Director General of the OIV, Alejandro FUENTES-ESPINOZA, Head of the Viticulture Unit of the OIV and Member of the Scientific and Technical Committee of the international "4 per 1000" Initiative, and Anne REUTIN, Project Officer for the Viticulture Unit.

Feel free to post the link to this special booklet on your websites and social networks.

Take care of yourself, your loved ones, as well as our soils.

Paul LUU  
Executive Secretary of the international "4 per 1000" Initiative

June 27, 2022

## 4 QUESTIONS TO MR. PAU ROCA, DIRECTOR GENERAL OF THE OIV

### 1) Mr Pau Roca, could you say a few words to introduce yourself?

I have been Director General of the OIV since 2019. I have dedicated the majority of my life to the vitivinicultural and olive oil sector, I am Spanish, and I have studied biology and maritime ecology.

### 2) As Director General of the OIV, what are the main actions that you undertake?

My actions are in line with the OIV Strategic Plan 2020–2024, which places a strong emphasis on issues associated with climate change and digital transformation in the vitivinicultural world. A large part of my work also involves internal organisation and relations with other organisations. The OIV is an international organisation composed of 48 Member States, and our decisions are taken by consensus. These decisions affect the world of vine and wine and focus on the regulation of the sector.

### 3) What does the “4 per 1000” Initiative mean for you?

The “4 per 1000” Initiative is a fantastic opportunity to bring all civil society stakeholders together around the topic of agriculture through the lens of soil. This initiative places agriculture at the centre of environmental and climate issues and demonstrates the importance of the role of growers in these issues.

### 4) What message would you like to convey to the Partners and Members of “4 per 1000”?

It is essential that all stakeholders unite in implementing concrete actions and methodologies to monitor performance. These actions should be adapted to the specific characteristics of each agricultural sector, to increase effectiveness. Let’s take advantage of this political momentum surrounding the issue of soils to instil good practices across the entire agri-food value chain.



Pau Roca, Director General of the OIV

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## PART I • THE OIV AND THE INTERNATIONAL “4 PER 1000” INITIATIVE

### OIV, HISTORY AND OBJECTIVES

The International Organisation of Vine and Wine (OIV) is an intergovernmental organisation of a scientific and technical nature, of recognised competence for its works concerning vines, wine, wine-based beverages, table grapes, dried grapes and other vine-based products.



Established in 1924, the OIV’s objectives are to provide information, assistance, harmonisation, standardisation and support to the vitivincultural sector. To do this, the OIV works with a network of around 1000 experts from all over the world. All of the OIV’s final decisions are taken by consensus among the Member States of the Organisation. In 2022, the OIV has 48 Member States from 5 continents, collectively representing 86% of total production and 71% of total consumption of wine globally. The work of the OIV is not exclusively geared towards Member States, but also towards other international organisations and the vitivincultural sector as a whole.

### THE OIV FACES THE CHALLENGES OF CLIMATE CHANGE

Environment and climate change are some of the main fields of study of the OIV and its members. For more than 20 years, the OIV has adopted a large number of resolutions on the calculation of the carbon footprint of the vitivincultural sector, in order to know in detail the different sources of emissions in the value chain. These resolutions and expertise collective documents aim to support and inform the sector on the issue of GHG emissions in the sector.

Regarding ecosystems, biodiversity and natural resources, which are very present in the vitivincultural sector, it is certain that climate change implies impacts on the environment, and it comes to break the “natural balances”.

The OIV, in order to tackle these impacts, addresses an important number of resolutions and technical and scientific works of international scope, such as “the importance of microbial diversity in the vitivincultural sector”, “agroecology in viticulture as a sustainable way to manage vineyards”, and “sustainable management of water and soil”.

Currently the OIV is working on many projects with different partners searching to fight climate change and its consequences for the vitivincultural sector. During 2021 and 2022, these actions focused mainly on the knowledge of tools on climate services with the aim to support players and stakeholders of the vitivincultural sector in the different decision processes regarding potential and important changes in climate and then have important impacts on vine and wine production.

## THE INTERNATIONAL “4 PER 1000” INITIATIVE: SOILS FOR FOOD SECURITY AND CLIMATE

Launched at UNFCCC CoP 21 in December 2015, the international “4 per 1000 Initiative: Soils for Food Security and Climate” aims to show that agriculture, and in particular agricultural soils, can provide concrete solutions to the challenge of climate change while at the same time meeting the challenge of food security by implementing agricultural practices adapted to local conditions: agroecology, agroforestry, regenerative agriculture, conservation agriculture, landscape management, etc.



The international “4 per 1000” Initiative promotes the natural sequestration of organic carbon in soils and brings the vision of healthy, carbon-rich soils to fight climate change and eradicate world hunger.

Based on solid scientific documentation, the international “4 per 1000” Initiative encourages all voluntary actors around the world to engage in a transition towards a regenerative, productive, highly resilient agriculture, based on appropriate management of land and soil, which creates jobs and incomes and thus leads to sustainable development.

Why “4 per 1000”?

An annual growth rate of 0.4% in soil carbon stocks, or 4‰ per year, in the first 30 to 40 cm of soil, would significantly reduce the concentration of CO<sub>2</sub> in the atmosphere, from human activities.

The 4‰ per year growth rate of soil carbon stocks is not a normative target for each country, but is intended to illustrate that even a small increase in the carbon stock of agricultural (including grasslands and pastures) and forest soils is a major lever to improve soil fertility and agricultural production and to contribute to the long-term objective in limiting the rise in temperature to +2°C, according to IPCC, the threshold beyond which the consequences induced by climate change would be of significant magnitude. The international “4 per 1000” Initiative is intended to complement the necessary efforts to reduce greenhouse gas emissions globally and across all sectors. Participation in the Initiative is voluntary, it is up to each Member or Partner to define the way in which it contributes to its objectives.

With 721 Partners, including 321 Members\* (as of May 2022), the international “4 per 1000” Initiative has a global reach. It is a unique Initiative composed of different “colleges” or stakeholder groups (signatory countries, international and regional organizations, public and private funding bodies, farmers’ and foresters’ organizations, research institutes, NGOs and civil society, and private companies), linked by an innovative electronic collaborative platform.

On June 15, 2020, the Consortium of Members approved the **Strategic Plan\*\* of the international “4 per 1000” Initiative which will guide its action until 2050**. The Implementation Plan of the Strategy is expected to be approved by the Consortium of Members this year.

The international “4 per 1000” Initiative is part of the **Global Agenda for Action**, an official supporting partner of the **United Nations Decade on Ecosystem Restoration 2021-2030**, and a partner of the **FAO Global Soil Partnership** (hosted by FAO).

The international “4 per 1000” Initiative is part of the **Global Climate Action Plan (GCAA)** adopted by the UNFCCC at CoP22 which follows up on the Lima-Paris Action Plan of COP21 and contributes to the goal of achieving a land degradation neutral world.

The Executive Secretariat of the “4 per 1000” Initiative is hosted by an international organisation based in Montpellier (France), the Alliance of Bioversity International & CIAT, two CGIAR research Centers, CGIAR being a global agricultural research partnership.

To learn more: [4 per 1000](#)

\* [List of Partners et des Membres](#)

\*\* [Strategic Plan - 4 per 1000](#)



## THE REINFORCEMENT OF THE COLLABORATION BETWEEN THE OIV AND THE INTERNATIONAL “4 PER 1000” INITIATIVE



Signing of a Memorandum of Understanding by Paul Luu, Executive Secretary of the international “4 per 1000” Initiative, Stéphane Le Foll, President of the international “4 per 1000” Initiative, Pau Roca, Director General of the OIV

The subject of vine growing soil health has become a priority for the OIV over the years.

The OIV and its experts continue to deepen its collaboration with the international “4 per 1000” Initiative. Viticultural soils constitute an important resource to contribute to issues adaption to climate change impacts, carbon sequestration, mitigation against climate change, food security and nutrition.

The OIV joined the international “4 per 1000” Initiative in 2016 just after the COP21 and has strengthened its commitment in 2022.

In April 2022, the OIV and the international “4 per 1000” Initiative signed a further cooperation via a Memorandum of Understanding around agroecological practices and sustainable soil management, which defined new lines of collaboration for the coming years.

### The objectives of this collaboration are:

- To promote carbon sequestration as a tool helping fight against climate change
- To develop a better understanding of relationship between soils and vine
- To identify and promote best practices and technical guidelines.



## PART II • TECHNICAL REPORT

### Vitivinicultural Sector - Definition

The **vitivinicultural sector** comprises all stakeholders in grape production (wine grapes [wine, juice and others], table grapes, dried grapes) and wine production.

[Watch the OIV Press Conference here](#)

## THE VITIVINICULTURAL SECTOR AND CLIMATE CHANGE

Climate change implies exceptional hazardous phenomena – destructive climatic incidents that tend to multiply and are of significant magnitude (periods of frost, hail, floods, drought, etc.), which disrupt yield, grape quality potential and grape and wine production.

In 2017 the global harvest was historically low because of major climatic phenomena in many regions of the world (Western European countries, in Latin America and southern hemisphere). These extreme phenomena are by definition sudden events, quite unpredictable and thus difficult to anticipate. They commonly occur on a local and regional scale, with a short duration and with irreversible consequences.

Moreover, climate change is associated with a constant rise in temperatures. The effects are already visible throughout the world, through these multiple aspects:

- General earlier occurrence and shortening of the main phenological stages (budbreak, flowering, veraison, and maturity) with important effects on the final grape production and wine quality.
- Change in the characteristics of grape composition, such as sugar content increases while the acid component can decrease, affecting the product quality.
- Modification in photosynthesis activity, gas exchange, and the light, water and nutrient use efficiency in the grapevine.
- Impact on the distribution pattern of pests and vectors, migrating from the tropical environments towards temperate regions, and the distribution and expansion of their parasitoids and predators, as well as on the trophic interactions in the vineyard.
- Change in winemaking process, for example constraints in the fermentation process of the grapes.
- Potential changes in wine sensory perception and consumer preferences: for instance, a potential increase of alcohol in wine.

## THE WORLD LIVING SOILS FORUM IN ARLES BY MOËT HENNESSY - FRANCE

The preservation of living soils is a fundamental commitment of Moët Hennessy in its sustainability approach. Soils, as a complex ecosystem, are one of the earth's most precious natural resources. Regenerating soils is key to mitigating and adapting to climate change and fighting the loss of biodiversity. Above all, it ensures sustainability and resilience for the entire Wine and Spirits industry. Today, throughout viticulture and agriculture, solutions and innovations exist everywhere to manage terroirs in a more sustainable way. It is our role to accelerate this transition by sharing best practices and knowledge.

Organized by Moët Hennessy, under the patronage of the Global Soil Partnership, the OIV and the international "4 per 1000" Initiative, the 1st [WORLD LIVING SOILS FORUM](#) "Mobilizing and acting for living soils" was held on June 1 and 2, 2022 in Arles-en-Provence (France) to:

- Connect people committed to soil regeneration
- Share concrete actions for sustainable and regenerative viticulture/agriculture
- Strengthen the link between Science, Innovation, and realities of the field
- Gather Science-based KPIs and methodologies to champion soil health.

The forum brought together researchers, experts, public institutions, journalists, trade associations and companies from the Food & Beverage industry for two days of conferences, round tables, masterclasses, and workshops.

[More than 100 speakers](#) shared their experiences and knowledge during the 1st WORLD LIVING SOILS FORUM.

To see or review the different interventions, click [here](#).

Moët Hennessy is a Partner of the international "4 per 1000" Initiative.



## MEZAGRI / MARCEL MÉZY - ENVIRONMENTAL SOLUTIONS - FRANCE

In France, in the heart of the Cahors AOC, on the [Cantelauze-Mézy wine estate](#), and like everywhere else on the planet, the vine is facing an increase in extreme climatic events: rising temperatures, periods of drought, which can cause an advance in the reproductive cycles of the vine, a reduction in the qualitative and aromatic potential of the grape... However, this situation does not affect this vine for which a respectful approach to the soils has always been privileged.

Thanks to a natural fertilization process, developed 40 years ago by Marcel MEZY, this vineyard combines quality and yield.

This process, composed of 28,000 strains of spontaneous micro-organisms, is a response to these challenges: improvement of soil structure, increase in root development, fight against diseases, better resistance to drought and excess water, storage of carbon in the soil, and elimination of the use of chemical inputs.

The engineers of the R&D laboratory working on this process are currently experimenting with a solution to combat mildew.

To learn more, please click [here](#).

'Mézagri et Sobac' is a Partner of the international "4 per 1000" Initiative.

## DOMAIN GEORGES ORTOLA - FRANCE

I am Georges ORTOLA, I studied science and obtained an engineering degree in 1981. In 1983, by chance I bought my first wine estate in the Languedoc Quatourze appellation, close to the Mediterranean in the south from France.

During the first years I practiced conventional agriculture, but quickly I noticed the limits of the system with diseases and pests that were increasingly difficult to fight with synthetic products.

In 2008, I converted to organic farming and then to biodynamic farming following a meeting with Pierre Masson, a pioneer of biodynamic farming in France.

The problem of grass management in the vineyard is a major concern for the winegrower, especially in a Mediterranean climate.

The result was often a great viticultural desert, namely vines and bare soil all year round, with the consequence of erosion, a very sharp drop in the rate of organic matter and therefore in the resilience of the vine vis-à-vis of the climate and the proliferation of predators subservient to the vine without competition due to a lack of biodiversity.

For more than 15 years now, I have been planting plant cover, resulting in a soil organic matter rate that has dropped from 1.3% to 2%, significant biodiversity and less pressure from vine pests.

The "4 per 1000" plan has the advantage of being an objective that everyone can understand. Farmers in general and winegrowers in particular, noting climate change, the limits of treatment products, society's rejection of agriculture considered as polluting, can explain that the practice of plant cover and the planting of trees increase the resilience of their soils and that, in addition, the increase in carbon capture in the soil through these practices is a solution to the increase in greenhouse gases.

In short, we are rediscovering what nature did to make our planet habitable a few million years ago by capturing carbon from the atmosphere and releasing oxygen through photosynthesis and solar energy."

The ORTOLA family owns the ORTOLA estates made up of castles (Notre Dame du Quatourze, Château Tapie, Château de Lunes, Château YMYS) in Narbonne and an estate in Canet d'Aude (France). The SCEA of Domaines Georges ORTOLA is a Partner of the international "4 per 1000" Initiative.

To learn more about ORTOLA wine domains, click [here](#).



## THE CARBON EMISSIONS OF THE VITIVINICULTURAL SECTOR

The vitivinicultural sector accounts for about 7 million hectares and represents 0,14% of the total of agricultural lands (5 billion hectares). Consequently, the vitivinicultural sector represents a small part of the emissions of the agricultural sector. The environmental impacts are however present, whether in terms of carbon, biodiversity, and resources consumption.

The main emission sources of the vitivinicultural sector depend on the final product. In the case of wine production, and considering the whole value chain, the major emission sources is the industrial phase (vinification, bottling, packaging, distribution, waste management) that represents 80% of the whole emissions. The glass bottles production is, by far, the main source of emission. Wine distribution may also contribute to the overall environmental impact of such chain, although the impact of distribution can widely vary due to distance, means of transportation and the efficiency of the logistics management.

The agricultural phase for wine production (vineyard planting, pre-production and production) represents 20% of the total carbon footprint. The use of pesticides and fertilisers, N2O emissions from fertiliser distribution, diesel consumption and soil management are the main sources of emission in this phase. Some variability among the agricultural phases of different vineyards can be analysed, for instance regarding the type of viticulture (conventional, organic, biodynamic...).

In order to reduce the emissions, it is essential to have a systemic approach taking into account the entire value chain of the product and thus avoiding the displacement of emissions.



## ALENTEJO REGIONAL WINEGROWING COMMISSION - PORTUGAL

Wine production is totally dependent on natural resources: solar energy, appropriate weather conditions, clean drinking water and healthy soils. These elements should be successfully integrated in an environmentally responsible way. The Alentejo Regional Wine Growing Commission (Portugal) considers that protection and enhancement of these natural resources through sustainable practices performed by a well-trained and highly skilled work force is a priority. In this context, the Alentejo Regional Wine Growing Commission aims to encourage members of Wines of Alentejo Sustainability Programme [to implement cover crops, as a recommended sustainable viticulture practice](#). The cover crop comes as a practical alternative land management practice, providing more sustainable viticulture due to its effects on environmental dynamics.

More information [here](#).

Alentejo Regional Winegrowing Commission is a Member of the international “4 per 1000” Initiative.



## PERNOD RICARD GROUP - FRANCE

**Marielle Marjolet, you are the QHSE and Sustainability Director of Martell Mumm and Perrier-Jouët (Pernod Ricard Group), what is the objective of your experimentation around regenerative viticulture?**

Our objective is to allow the vine to adapt to climate change and to build a system that is resilient to these climatic phenomena which will be increasingly extreme. The key factor of this adaptation is to have living soil: fertile and capable of conserving humidity. After a detailed mapping of our vineyards, we have defined a program in three areas:

- the restoration of the soil's health potential by implementing specific practices such as the selection of adapted plant cover
- nutrition and natural protection of the vine through interactions between the plant and the soil or the use of bio- in-trants
- the conservation and restoration of the landscape and its biodiversity through territorial mosaic work or the reintroduction of functional biodiversity.

To learn more, please click [here](#).

Pernod Ricard has been a Partner of the international “4 per 1000” Initiative since June 2021.

## SOIL, VINES, AND CLIMATE CHANGE - THE CHALLENGE OF IMPROVING SOIL CARBON RATES IN VINEYARD SOILS

Grapevines are cultivated on 6 out of 7 continents, roughly between latitudes 4° and 57° in the Northern Hemisphere and between 6° and 43° in the Southern Hemisphere across a large diversity of climates (oceanic, warm oceanic, transition temperate, continental, cold continental, Mediterranean, subtropical, attenuated tropical, and arid climates). Grapes are grown on a surface area of more than 7 million hectares with an annual production of about 60 million tonnes of fruit, the highest monetary value of fruit crops on the globe, and wine being part of the UNESCO intangible cultural heritage of humanity sometimes produced for thousands of years on the same sites.

Soils for grape production are more than just a place to grow a plant, they are part of the character of fruit and wine, regional identity, and convey a sense of place. In order to preserve and improve the health of these soils and to ensure their sustainability, it is important to understand these complex eco-systems, one of earth's most precious natural resources.

Viticultural soils have been warming at rates similar or faster than air temperature and this will have an impact on the distribution of microbial populations, the decay rate of organic matter or the storage capacity for soil organic carbon (SOC), thus affecting the emission of greenhouse gases (GHGs). Interactions between micro-organisms in the rhizosphere, the grapevine root system, degradation and fixation of SOC are complex and poorly understood but respond to environmental factors (such as increased soil temperatures), the plant material (rootstock for instance), respectively the cultivation system (for example bio-organic versus conventional, cover crop use versus open tillage for example).

Studies have shown that soil warming as compared to cultivation practice has a much smaller impact on SOC-storage. The diversity of vineyard soils across the planet thus can be part of the C-storage initiative and contribute to this negative emission technology. The task, however, is complicated, since cover crops for example, an essential part of any C-storage initiative, are competitors for water, and vineyard sites are usually dry sites. Nevertheless, improving soil organic matter and thus soil carbon will also improve soil water holding capacity and depending on the climatic region, this may just be enough, to avoid the implementation of irrigation systems, saving water, another precious resource.

Because of the large diversity in climate conditions and site-characteristics it will be a complex challenge to devise site-adapted strategies to improve carbon storage in vineyard soils and contribute to climate mitigation but it should be feasible!

- Prof. Dr. Hans Schultz  
President Hochschule Geisenheim University

## BIOCHAR USE IN VITICULTURE REPORT

Biochar has been successfully used in viticulture to boost productivity through improved plant and soil health without negative effects to the grape or wine flavor. There is a large body of research supporting the application of biochar in viticulture specifically, as well as in soils and compost. A dozen of the most recent and relevant are highlighted in support of biochar's use in viticulture. While there are some caveats to be considered when applying biochar, if it's matched appropriately to the soils at establishment, growers are seeing a 2 to 3 harvest payback.

The growing need for improved water management is one of the prime benefits seen in vineyards, and that need is expected to intensify as a changing climate affects water availability further. An additional benefit to an investment in biochar is its longevity—measured in decades to millennia—which also opens the potential for economic benefit from the developing carbon credit markets.

For biochar producers, there are almost a million acres of grapes in the US, offering the industry a sizable market. A one percent market penetration would require about 10,000 tons of biochar annually and though the bulk of grapes grown in the US are along the West Coast, the viticulture market provides opportunity in almost every state.

The lead authors of this 'Biochar Use in Viticulture' report are Harry Groot, Ashley McFarland and Kathryn Fernholz of Dovetail Partners; Kathleen Draper, International Biochar Initiative (IBI) and Tom Miles, US Biochar Initiative (USBI).

The work upon which this project is based was funded in whole or in part through a grant awarded by USDA Forest Service Wood Innovations (20-DG-11083150-011). USDA is an equal opportunity provider, employer, and lender.

To download the report, click [here](#).

To watch the accompanying webinar, click [here](#).

International Biochar Initiative is a Member of the international "4 per 1000" Initiative.

## CARBON STORAGE IN SOILS: VIDEO BY THE FRENCH INSTITUTE OF VINE AND WINE (IFV)

### What is carbon storage in soils?

In 3 minutes, this video explains the fundamental role soils (particularly viticultural soils) can play in storing carbon, to reduce the carbon footprint of viticulture.

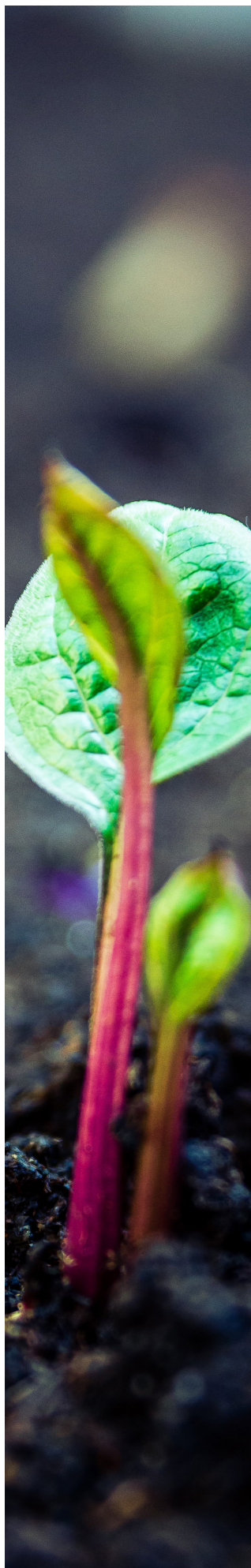
Watch [here](#).



## PANECO AMBIENT - ITALY

Partner of the international "4 per 1000" Initiative, the Italian company Paneco Ambiente S.r.l. has been producing organic soil improvers allowed in organic farming for over forty years. Their humus line is obtained from non-industrial bovine manure and agricultural vegetable by-products, all from a traceable supply chain. It is pollutant-free, slowly matured (12-15 months), and is able to restore the ecological balance of impoverished soils.

To learn more, click [here](#).





## AGROFORESTRY: TREES IN THE MIDDLE OF VINEYARDS, A RETURN TO AN ANCESTRAL PRACTICE

Agroforestry associates agricultural production with silvicultural plantations within the plot itself but also outside through planted borders. This practice resumes the original association of the vine-tree based on the stake tree. The traditional technic of “joualles” allowed a form of vertical polyculture, the tree providing shade and protection against frost and hail.



Joualles (Vendanges d'autrefois, Philipp Hackert, 1784)

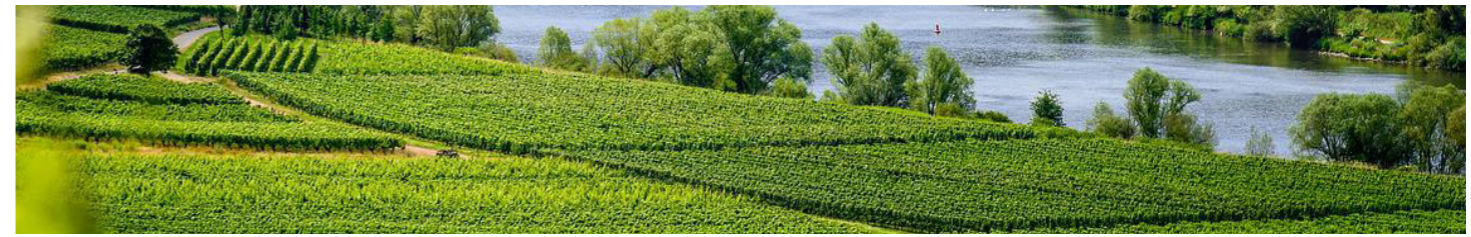
A precise choice of species must be made according to the particularities of the vine and the environment. Multitude of species can be associated with vine: country (elms, maples, ashes, poplars, hornbeams, mulberries) but also fruit trees (plum, pear, apple, olive, almond, fig, peach, cherry, apricot ...)

The plantation of these trees has influences on:

- Light capture: with a differential between northern exposure in the shade and southern exposure in the sun. The trees produce infrared radiation and heat towards the ground, reducing the risks of frost induced by radiative deficit,
- Water cycle: trees recycle deep water resources and inject large quantities of water vapor into the atmosphere, thus moderating temperature peaks. They are also important traps for water, captured in the form of dew and rainwater,
- Changing turbulence fields (microclimate): vineyards form confined environments in which air circulation is impeded. Isolated trees increase turbulent flows, attenuating temperature peaks.

Therefore, in a viticultural context, agroforestry shows interest on several levels:

- From a societal point of view: it meets the growing needs of consumers and local residents to have a quality product with minimal impact on natural resources
- From an environmental point of view: it favors the development of biodiversity in the plot, it limits the losses of leaching by nitrogen and increases the capacity of carbon storage. Hedges also help to limit the aerial drift of phytosanitary products.
- From an economic point of view: it brings a gain in biomass productivity, and also the annexed valorization of fruits and of some precious wood species. The investments to be made are however consequent: purchase of trees, planting, maintenance...



### THE VINE, COVER CROPPING AND AGROFORESTRY - AGROECOLOGY AT THE SERVICE OF ALL TYPES OF VITICULTURE

When it comes to developing efficient and sustainable viticulture, optimising the production of biomass in a territory while protecting natural resources, and making large-scale savings and ensuring the viability of farms through plant engineering, it is all about transforming constraints into assets, to meet all of the challenges of a territory.

In the context of climate change, of rising costs of energy and inputs, and of land development and pollution, it seems wise to put the emphasis back on managing the plants that are all around us. This plant life makes cross-cutting contributions to water, soil, biomass, biodiversity, the landscape... And it is managed on different scales, from the plot to the batch, or from running water boundaries to the watershed... Its management makes it possible to generate new resources that directly benefit both the grower and the regional economy.

Above all, it is a question of protecting soils from erosion, nitrate leakage, pollution linked to overuse of phytosanitary products, etc. Non-labour, direct sowing and the use of permanent cover crops, including alongside trees and with maximal use of soils, are solutions to these problems.

Vine cultivation is one of the biggest types of agricultural production in France. The vine remains a product with high added value, providing a living for large numbers of growers. In some regions, it is at the centre of their economic dynamism, particularly due to its influence on rural tourism. The future hinges on the capacity to develop types of production that explicitly, in a modern and ambitious way, take into consideration the landscape and environment dimension.

Additionally, growers are facing agronomic and climate difficulties and increasingly having to combat ecological and economic pressures.

#### The art of mastering the soil

The primary victims of the divorce of agriculture from the environment, trees, agroforestry techniques and soil cover cropping practices can nevertheless lead the way in re-establishing this connection as part of mixed production systems. They are both quantitatively and qualitatively more effective and above all much more sustainable, and thus fully in keeping with the new agroecological and societal transition. Simultaneously key symbols and agents of the inevitable reconciliation between the economy and ecology, trees are ideally situated at the interface of a double challenge: combining the productivity of agrosystems with the protection of natural resources.

The ‘non-forest’ tree is one of the most effective, versatile and realistic, as well as inexpensive, solutions for developing land-use planning and remedying the many kinds of damage that the land has suffered. And because the ‘non-forest tree’ itself can, without even moving, have a positive impact on all of the natural cycles on which our existence depends: water, climate, carbon, biomass, oxygen, energy, biodiversity, etc.

The results are very positive: a well-designed agroforestry plot is more productive than its neighbours, and trees, far from monopolising resources, share and multiply them. A “natural input” that will, in situ, mobilise and disseminate water, carbon or organic matter, biodiversity, etc. – in short, everything that the soil and all types of production require. In the longer term, trees are heritage that can be harnessed for the intended usage: fruit, lumber, fuel, but also mulch or fertiliser (ramial chipped wood, or RCW) from maintenance pruning, which is an unparalleled soil improver.

Throughout France, grape growers are attending training and field days, and groups are forming and collaborating around practices that make a lot of sense for viticulture that works with nature and not against it.

This relevant, efficient viticulture sees the rapid return of insects, bees, bats, worms, etc. It also ensures quality, mitigates health and climate risks, and is a gauge of sustainability and thus productivity. Watch Ver de terre production “Viticulture and agroecology” [here](#).

Ver de Terre Production is a Partner of the international “4 per 1000” Initiative.

- Alain Canet  
Director of Trees & Landscapes

## PUBLIC POLICIES AND CARBON SEQUESTRATION BY VINEYARD SOILS

The important role of agriculture and soils in climate conditions is undeniable. The expansion of industrial agriculture feeds the greenhouse effect with CO<sub>2</sub> (carbon dioxide), methane and N<sub>2</sub>O (nitrous oxide) from the soil. The vitivincultural sector, on its own scale, is also a contributor to this phenomenon.

For some time now, a different vision has been emerging: the possibility of storing organic matter in agricultural soils as a lever for climate action. The international “4 per 1000” Initiative is an example of its awareness. Thus, it is necessary to implement practices that preserve the organic matter already present in agricultural soils and promote carbon sequestration.

However, even though a large majority agrees on the importance of implementing these practices, there is a strong inertia in the system. This resistance to change can partly be explained by a lack of knowledge sharing, a lack of support, and the fact that the farmer may find himself alone in bearing the economic burden of a transition.

The role of public authorities is therefore essential in encouraging the implementation of adapted practices. This is especially true since current programs that encourage the implementation of environmentally beneficial agricultural practices do not sufficiently consider the soil ecosystem issue. The question is if it would not be more effective to set up specific parallel programs dedicated to soil health, at the risk of fragmenting public offers and losing clarity. The question of carbon content is considered as the main indicator to address agricultural soil health. Currently, political strategies tend to create dedicated programs, leading to a hybrid financing system where the private sector finances agroecological practices and carbon sequestration thanks to the voluntary carbon market. Many factors must be considered to ensure the success of such policies that are not equally accessible and profitable by all sectors.

Thus, the financial aspect is crucial: The participation of other civil society actors allows diversifying the sources of financing and involving society in a common project of participation in the climate effort. Furthermore, greater emphasis must be placed on the results of the practices put in place, in order to avoid abuses and to guarantee the effectiveness of the programs. Monitoring the results is essential for the adaptation of public policy incentives.

The vitivincultural sector has an essential role to play in these issues, although the potential for carbon sequestration is not as high as for other sectors due to its small Utilised Agricultural Area (UAA). First, the survival of the world’s vineyards is at stake, as they are strongly threatened by the impacts of climate change, the implementation of agroecological practices centred on soil is a way to be more resilient to these dangers. Secondly, there is also the issue of exemplarity, as the sector has a certain economic weight and the capacity to financially support a costly transition. Finally, there is the cultural challenge of placing the land at the heart of viticulture. What sector is better placed than wine to demonstrate the importance of terroir? Especially since the climates of Burgundy have been registered in 2015 as a UNESCO World Heritage Site.

The 2021 and 2022 vintages confirm again the climate change impacts and consistency on vines in France: late frost, hail, heat waves, mildew attack... 90% of the harvest was lost in some regions. Vines will be increasingly subjected to stresses caused by climate change. Winegrowers will therefore be forced to adapt. However, the implementation of more sustainable and resilient practices may initially weaken them and accentuate an already present risk. The role of the State is to accompany these actors so that they do not bear alone the weight of this transition, which is necessary for the whole society.

- Alejandro Fuentes-Espinoza (OIV Head of Viticulture Unit),  
Anne Reutin (OIV Project Officer for the Viticulture Unit)



## RETAILLACK VITICULTURE - AUSTRALIA

Retallack Viticulture Pty Ltd offers a broad range of viticultural and agroecological consulting services throughout Australia and overseas including the EcoVineyards program in Australia. Retallack Viticulture is focused on growing resilience, profitability, and ecological practices in vineyards. Retallack Viticulture shares tailored, practical, and timely solutions to improve soil health by incorporating supplementary flora which provides habitat for predatory arthropods, microbats, and insectivorous birds. Retallack Viticulture helps wine growers improve and measure functional biodiversity and ecosystem services in and around vineyards.

For more information, please click [here](#).

Retallack Viticulture Pty Ltd is a Partner of the international “4 per 1000” Initiative.

## GRUPO AVINEA - ARGENTINA

Grupo Avinea seeks to conduct Argentine viticulture in a sustainable way, respecting the environment and developing brands with high perceived value, marketed nationally and internationally, driven by innovation and consumer-oriented, offering a wide portfolio of products with enduring attributes that include Argento, Otronia, Cruz de Piedra, Pacheco Pereda and Cuesta del Madero.

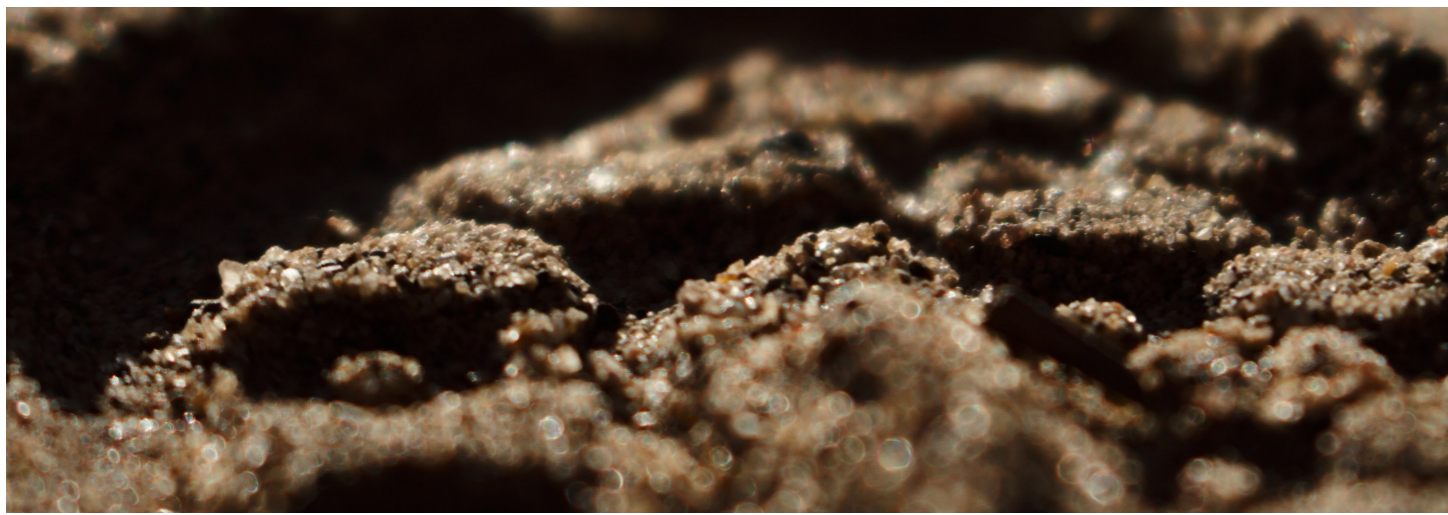
The soil plays a key role for Grupo Avinea to consolidate itself as the largest organic wine producer in Argentina. The vines were developed on the basis of a prior soil map in order to characterize the sectors within the farm which allowed Grupo Avinea to distribute the grape varieties in the different plots. Through various soil studies: surveys, textural analyses, state of health of roots and plants (viruses and nematodes) and study of micro-organisms, soil health is reviewed and assessed annually. An agronomic management is carried out which seeks that the roots of the vineyard naturally explore the greatest possible volume of soil. Throughout the crop cycle, cover crops are maintained (living grass or pruning remains, leaf remains) which, in addition to having a role in promoting surface and underground biodiversity, help keep the soil alive and to protect it from erosion.

Grupo Avinea considers the soil as a living organism for which they pay particular attention and respect, which is why, in addition to during vinification, the oenological team ensures that each wine of the Avinea Group enhances the soil characteristics of each vineyard in its sensory profile.

For more information, please click [here](#).

Grupo Avinea SA is a Partner of the international “4 per 1000” Initiative.





## RÉMY COINTREAU - FRANCE

Partner of the international “4 per 1000” Initiative, Rémy Cointreau is a family-owned spirits group rooted in sustainable development. Our exceptional wines and spirits take root in the soil of our terroirs. But climate change threatens their very existence. This is why we are committed, with our winegrower and farmer partners, to deploying agro-ecological practices that meet the challenges of climate change, to become players in soil resilience and protectors of biodiversity, and to promote our soils as “carbon sinks”. Thus all of our brands have begun to make commitments to their terroirs, starting with Rémy Martin in Cognac, whose supplies of eaux-de-vie come from the Domaines Rémy Martin and the Alliance Fine Champagne, a cooperative created by the company in 1966.

- For several years, **Domaines Rémy Martin** has been carrying out experimental studies aimed at gradually reducing the use of phytosanitary products (Ecophyto project, coordinated by the French Ministry of Agriculture), the use of biocontrol products, the development of plant cover, the development of precision viticulture, and the mapping of soil health. In 2012, Domaines Rémy Martin was the first in Charente to be certified HVE (and the 6th in France). This certification was quickly shared with all the partners of the Alliance Fine Champagne via a customized training program.

### • Rémy Martin and the Alliance Fine Champagne: a collective adventure

Rémy Martin has also conducted a pilot project with Genesis (the world’s leading soil rating agency) to co-construct a relevant soil health measurement reference system for the Cognac AOC. The study of the soils of the Petite and Grande Champagne terroir continued in 2021/2022, with the support of 30 partner winegrowers and Domaines Rémy Martin. In total, about 150 plots were analyzed in order to establish a baseline map of soil health. The objectives of this study are multiple: to better understand the functioning of the soils of the AOC, to target the levers for improving their health, but also to determine the cultivation methods that have a positive impact on this terroir, particularly in terms of carbon sequestration and biodiversity. In the years to come, this project will allow us to accompany the House in its agroecological transition and to scientifically measure its impact on the planet.

To learn more, please click [here](#).

‘**Maison Telmont**’, for its part, has chosen to turn to organic farming, with the aim of converting 100% of its vineyard and its supplies to organic farming by 2025. This ambition is particularly audacious, at a time when only 4% of the Champagne vineyard area is certified or in the process of AB certification. This approach translates into the following main cultivation methods:

- No use of herbicides (since 1999) and unnatural pesticides, with integrated pest control through the use of hormones;
- Use of biocontrol products to stimulate the natural defenses of the vine, the use of herbal teas and biodynamic treatments to stimulate the growth of the vine;
- Prevention against soil erosion by grassing our soils or the edges of the plots;
- Plot approach for plant cover, grassing and tillage;
- In 2021/2022, ‘Maison Telmont’ has also initiated tests on 5 new green manure mixtures, on 2 plots.

To learn more, please click [here](#).

## ART-ER (ATTRATTIVITÀ RICERCA TERRITORIO - EMILIA ROMAGNA) - ITALY

SOIL4WINE project: an opportunity for farmers and environment

Soil4Wine is a LIFE project\* aimed at improving soil management in viticulture and at defining methods to support soil ecosystem services (ES).

ART-ER was responsible to assess soil ES in physical and monetary terms and to exploit payments opportunities to reward farmers.

Adoption of good practices as grassing, cover crops and mulching, improved erosion protection (-85%), water yield (+55%), carbon sequestration (+15%), biodiversity preservation (+30%) and landscape quality.

Economic evaluation of ES:

- erosion protection 700 €/ha year,
- water yield 600 €/ha year,
- carbon sequestration 44 €/ha year,
- biodiversity preservation 60 €/ha year,
- landscape quality 50 €/ha year.

Feasibility tests of payments for ES:

1. Reclamation tribute for erosion protection: sustainable farmers pay a lesser tribute
2. Wine label for water yield: wine producer pay more the grapevine to sustainable farmers (and add a label to the wine bottle)
3. Tourist tax for landscape quality: a part of the tax is aimed to reward sustainable farmers
4. Park museums ticket for biodiversity preservation: a part of the ticket is aimed to reward sustainable farmers.

For details, please click [here](#).

ART-ET is a Member of the international “4 per 1000” Initiative.

- Enrico Cancila, Alessandro Bosso  
ART-ER

\*The LIFE project is a financial instrument of the European Commission, dedicated to the support of innovative projects, private or public.





[The International Organisation of Vine and Wine](#)

[The international “4 pour 1000” Initiative](#)

**OIV**