Deliverable T1.1.1.

Document with definitions, criteria, and methods for selection of demonstrative viticulture areas and agro-ecological vineyards

Annex: 29 Best Agro-ecological Practices

Responsible Partner

Provincia Autonoma di Trento

With the contribution of all PPs

05/11/2020

Introduction

The main purposes of the ECOVINEGOALS/Interreg ADRION project are to share a single vision among partners on agroecological principles and methods to be used in vineyards within the focus/perspective to promote agroecological transition in fragile viticultural areas.

In line with this objective, a list of 29 best practices for the transition from intensive to agroecological viticulture management systems was compiled with the contribution of all project partners. The practices selected are applied in at least one of the project partners' study areas. The list is not exhaustive but purely indicative. A good practice description form was filled in for each practice, including a short description, aims and expected outcomes, suggestions for implementation, improvable/critical issues, bibliographic references, and pictures.

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GOOD PRACTICE DESCRIPTION FORM		
Title	Agroforestry	B.S.1
Short description of the practice	Agroforestry is a type of integrated crop that combines traditional agricultural techniques with those of forest management, combining woody and perennial plants with herbaceous crops and/or animal husbandry to create more efficient, productive, and healthy land-use systems, diversified by type and sustainability. The integration of trees, shrubs, annual crops, and animals into vineyards are ancient practice in the Mediterranean area. Various types of agroforestation can be distinguished: the silvoarable systems are those in which tree species (woody plants, fruiting plants, or other) and herbaceous crops are developed. Forestry and pastoral systems combine livestock and arboriculture (for wood or fruit). Then there are the linear systems, in which hedges and the like, located at the edges of the fields, perform a function of protection for agro-ecosystems and of "defense" for agricultural surfaces. The so-called riparian belts are those in which tree and shrub species are placed at the banks of waterways to protect them from degradation, erosion, and pollution. Finally, there are cultivations in the forest, mostly mushrooms, berries, and other non-wood products. With this practice, emphasis is placed on long-term agroforestry land-use practices and woodlot management, satisfying the three criteria: intensive, interactive, and integrated.	
Aim of the best practices	It optimizes production while reducing land consumption at the same time; it guarantees greater diversification of production, protection of the soil from erosion and pollution, and increased fertility and "storage" of carbon within the soil. Furthermore, there is a greater stabilization of the soils, which in turn brings mitigation of climate change and adaptation, as well as benefits for the biodiversity of the territory. Other positive effects of agroforestry are characterized by windbreaks, the recovery of the biomass obtained (which can be used for energy purposes), and by the creation of the so-called "buffer strips," which can decrease the runoff of surface waters. In addition, it increases the stability of the slopes, supports the main crops, provides shade and mitigation of extreme temperatures, protects from hail, provides supplementary income, creates landscape and natural barriers in contrast to harmful insects and pests, and increases biodiversity and organic soil matter.	

Suggestion for implementation	Farm animals can play a key role in agroforestry. For example, geese in the vineyard are free to wander among the rows in search of grass at ground level, which they feed on. Geese keep the vineyards healthy without damaging them, keep the soil "clean" from weeds, naturally fertilize the soil with their manure, feed without being fed by chemical feed and save the farmer numerous costs, a virtuous and concrete Italian example of the use of geese in the vineyard. If it is true that geese are a cure-all among the vineyards, the hens have proved to be precious for the olive trees. Their continuous scratching has the dual function of eliminating insects and harmful pests (in particular, the feared oil fly), gently stirring the soil, and oxygenating it. In addition, the natural cycle of the absorption of animal dejections by the soil provides a 100% natural fertilizer at no cost. Below you can find two research experiences about Agroforestry. They were presented at the 4th World Congress on Agroecology in 2019. Montpellier, France.

	"Impacts of sheep integration on soil carbon sequestration and function in a Northern California coastal vineyard system." Kelsey Brewer, University of California, Davis. Integrated sheep-vineyard systems (ISVS), a type of mixed agroforestry system, utilize sheep to graze resident vegetation and/or cover crops and facilitate the provision of ecosystem services for vineyard production. However, quantification of carbon sequestration and soil health impacts from livestock integration into perennial cropping systems remains unclear. We conducted a survey study of three long-term (10+ years) ISVS plots to assess soil health shifts from animal integration. Our results support that ISVS has substantial potential to increase soil C storage and improve important ecosystem synergies such as microbial functioning and biogeochemical cycling.  *"Diachronic study of the effect of growing trees on grapevine yield: 24 years of experience in the South of France.* *Marie Gosme, Montpellier. 4th World Congress on Agroforestry."* Gosme M. Climate change. In France, there are a lot of fears for the vinegrower because of frost and high temperatures. Therefore, Agroforestry can mitigate this problem. Effects of trees (sorb, stone pine, Italian alder, Mediterranean cypress, pear) on the grapevine: Night sky mask made by the trees - reduces radiative cooling at night, thus reducing frost risk; Daytime shade - reduces temperature during the day, potentially reducing heat stress but at the same time there is a negative effect; it reduces the photosynthesis. By this research, it was observed that in the agroforestry vineyards (2, 19%), frost is more reduced than in pure vineyard control (7, 02%). Data from 21-24 April 2017-Important Frost.
Expected Results	Soil conservation, watershed protection, long-term improvement of soil fertility, improvement of microclimate, lower incidence of pests and diseases, reduction of external inputs (fertilizer, pesticides), diversification of production, reduced dependence on the instability of commodity markets, diversified supply for home consumption, production of non-food-products (timber, firewood, fodder, etc.), maintenance of landscape beauty and natural diversity, development of cultural traditions and experiences.

Improvable or Critical Aspects	We suggest another interesting aspect that can be implemented to find a traditional viticultural practice concerning agroforestation forgotten over the years in your country (if possible) and try to analyze and implement it in the vineyard. For example, in the past, in Italy\ it was widespread for vines to be grown in association with other crops (for example, mulberry). In this way, the farmers produced two products, grapes and silkworms.
Bibliographic indications	Lo sviluppo viticolo del Trentino. Giuseppe Ruatti, 1955 4th World Congress on Agroecology in 2019. Montpellier, France http://www.eurafagroforestry.eu
	https://www.agforward.eu https://cantieredelbaco.wordpress.com/
References	Provincia Autonoma di Trento, Euraf-agroforestry, AIAF

Pctures (1/3)	 *Dro* - Viti, susini, peri ed ulivi sui seminativi. *(foto Ruatti)* Trentino, 1953 (Vines with pear, olive, and plum trees)  Alfalfa that invades the inter-row of the vineyard (Vallagarina, Trentino 1955)

Vine grown together with mulberry, Belluno (Veneto, 2017)

Geese in the vineyard, Tuscany 2018

GOOD PRACTICE DESCRIPTION FORM		
Title	Bio-District	B.S.2
Short description of the practice	Bio-District or Eco-region is a territory naturally devoted to organic, where farmers, citizens, and public authorities realize an agreement aimed at the sustainable management of local resources based on the principles of organic farming and agroecology. A Bio-district is a geographical area where farmers, citizens, tourist operators, associations, and public authorities enter into an agreement for sustainable management of local resources based on organic principles and practices, aiming at the fulfillment of the economic and socio-cultural potential of the territory. They act according to the principles and methods of organic production and agroecology. The bio-district experience began in 2004 in the south of Italy, and from the early stages, farmers have been put at the center. In 2009 the Italian Association for Organic Agriculture (AIAB) launched the first bio-district in Italy. It supports and coordinates all local farmers interested in engaging in agroecological transition. Bio-districts are initiatives at the local level inserted in a larger network at the national and international level, such as INNER, which allows sharing knowledge, scaling out, and scaling up virtuous experiences worldwide. Each Bio-district is marked by lifestyle, nutrition, human relations, and nature. It results in those agricultural productions being more valuable and typically characterized, hence more appreciated by the market. Joint work among farmers, consumers, and public administrations generates a number of opportunities, including green public procurement and providing healthy and nutritious food to school canteens and hospitals. This allows leveraging the functional biodiversity and creating effective alternatives to industrial agriculture, with a view to achieving food sovereignty. The people in the territory decide what to produce, applying agroecological principles. Additional advantages are generated by shortening the supply chains, increasing the income of local producers, and facilitating the inclusion of disadvantaged people in production activities and their consequent social integration. Bio-districts constitute a favorable context for the development of social agriculture and participatory governance. In this sense, the EU community themes relating to interactive and participatory innovation are pursued.	
Aim of the best practices	The bio-district represents an innovative approach for sustainable, integrated, and participatory territorial development, which builds around the environmental, social, and economic dimensions by: 1) Promoting participatory landscape design and adopting agroecological system approaches at the field level 2) Finding and creating solid and equitable local markets 3) Enhancing local access to the young generations 4) Simplifying organic certification schemes for producers 5) Enhancing environmental awareness and local traditions 6) Recognizing food sovereignty and the cultural identity of the local communities. The objectives of the bio district can be grouped into three main areas: • **Economic**: more profitable agriculture by applying a system approach at the field level and creating new market opportunities for producers.	

	• **Environmental**: applying a more sustainable agriculture system through practices able to reduce the environmental impact of farming on natural resources, greenhouse gas (GHG) emissions, and building up a diversified landscape. • **Social**: favoring rural employment and enhancing social capital through facilitating land access to young generations, enhancing aggregations and knowledge exchange between different stakeholders, and recognizing the role of farmers as the real ecosystem stewards.
Suggestion for implementation	Improve the bio-districts network operating internationally and improve the synergy between the different experiences. The network will be the tool to convey the different local knowledge, the products, and the promotion of the territories and create new support opportunities.
Expected Results	Recognizing bio-districts' essential role as a tool to enhance the territories and create healthy employment based on economic activities of the real economy. The exchange of people (experiences, knowledge, tourists) and products will represent a great economic opportunity for all bio-districts.
Improvable or Critical Aspects	In order to protect organic production methods, it is important to organize research activities, divulgation, training, and information on organic agriculture and sustainable land management.
Limitation or Adaptability	Sometimes, mostly the first time, it is difficult to discipline the producer organization with a proper law. So, it is fundamental to try to compose a correct document that encompasses all shared strategies and activities with an agreement signed by farmers, citizens, and institutions that show the correct way to work all together.
Bibliographic indications	Scaling up agroecology to achieve the sustainable development goals- Proceedings of the second FAO international symposium: 3 - 5 April 2018, Rome, Italy. Food and Agriculture Organization of the United Nations Bio agricoltura – dal campo alla tavola, salute e gusto. Maggio/Agosto 2014 www.ecoregion.info http://www.biodistrettovaldigresta.it/
References	Provincia Autonoma di Trento – Val di Gresta Biodistrict (Trentino) e Val dei Laghi Biodistrict

Bio Distretto Valle dei Laghi

GOOD PRACTICE DESCRIPTION FORM		
Title	Biodiversity Friend	B.S.3
Short description of the practice	Biodiversity Friend is a private standard owned by WBA (World Biodiversity Association) and released in 2010. WBA was founded in 2004 at the Museum of Natural History in Verona (Italy) with the main purpose of protecting and enhancing biodiversity through wide-reaching educational activity. Biodiversity Friend is not restricted in certifying the engagement of the farm towards *a real reduction of the biodiversity loss but represents a stimulus for the farm towards a progressive increase of the biological diversity and an improvement in the quality of the products.* In this way, the farmers finally become outright tutors of the environmental integrity of the agrosystems and, in this dimension, must be considered by the public opinion (that represents at the same time the consumers) and by the persons responsible for the decision-making processes. The trademark "Biodiversity Friend" is owned by WBA and is patented worldwide. CSQA is the only certification body chosen by the WBA to certify Biodiversity Friend. The certification standard “Biodiversity Friend” considers the environmental impacts of the activities and transformation processes in agriculture on the ecosystem quality and biodiversity loss. The operative strategies have been fixed in 12 actions related to Methods of parasite and weed control, methods of soil fertility reconstitution, hydro resources management, presence of hedges and woods, presence of nectariferous species, conservation of the agrarian biodiversity, soil quality, water quality, air quality, use of renewable energy, methods of low impact production, other actions that can have beneficial effects on biodiversity. The standard is applicable to all farm productions. Environmental quality is selected through the biodiversity indicators of the soil, water, and air, based on biomonitoring methods developed by the WBA Onlus Scientific Committee.	
Aim of the best practices	The aim of the standard is to ensure that the production process does not lead to a loss of biodiversity resulting in the disappearance of plant and animal species present in the specific working area and to ensure that the company is constantly engaged in improving the quality of the environment in which it works. Farmers, in this sense, are true guardians of the environmental integrity of the area.	
Suggestions for implementation	This adds one more floristic and vegetational indicator to integrate the certification in order to have the best control of biodiversity in the pilot farms vineyard involved in the Ecovinegoals project.	
Expected Results	It aims to protect biodiversity during the manufacturing process. It promotes the farm-tourism aspects of the area, increasing the consumer’s attention to areas not traditionally considered places for tourism and recreation.	
Improvable or Critical Aspects	A critical aspect can be the expenditure and the cost of the certification.	

Bibliographic indications	https://biodiversityassociation.org/it/ https://www.csqa.it/
References	Provincia Autonoma di Trento, CSQA, Biodiversity Friend

GOOD PRACTICE DESCRIPTION FORM		
Title	Bio Stimulants in Viticulture	B.S.4
Short description of the practice	*Plant biostimulants contain substance(s) and/or micro-organisms whose function, when applied to plants or the rhizosphere, is to stimulate natural processes to enhance/benefit nutrient uptake, nutrient efficiency, tolerance to abiotic stress, and crop quality.* Biostimulants include diverse formulations of compounds, substances, and micro-organisms that are applied to plants or soils to improve crop vigor, yields, quality, and tolerance of abiotic stresses. What distinguishes biostimulants from traditional crop inputs? Biostimulants operate through different mechanisms other than fertilizers, regardless of the presence of nutrients in the products. Biostimulants differ from crop protection products because they act only on the plant's vigor and do not have any direct actions against pests or diseases. Crop biostimulation is thus complementary to crop nutrition and crop protection. Biostimulants are a critical ingredient in Europe's sustainability. 1. **Humic substances:** Can be defined as complex organic macromolecules that come from the decomposition of the organic substance and the metabolic activity of microorganisms. Humic substances exert a stimulating action on the growth of plants directly and indirectly. Humic substances exert a direct effect on the plant by stimulating rhizogenesis. In addition, a positive effect of humic substances was found on the activity of the radical transporters involved in the absorption of nitric nitrogen with a significant increase and on the activity of the enzymes involved in the assimilation of nitric nitrogen. The greater radical development and the higher activity of the nitrate radical transporters translate into greater efficiency of absorption and assimilation of inorganic nitrogen by the culture. Humic substances also positively influence the secondary metabolism, promoting the accumulation of antioxidants and the activity of the defense enzymes from oxidative stress caused by free radicals that are generated as a result of environmental stress. The indirect action of humic substances is expressed in the soil through an improvement in fertility. In fact, the humic substances in the soil cement the inorganic particles of the aggregates, which are more stable, increase the CEC (cation exchange capacity), and exert a buffer effect on the pH, increasing the bio-availability of the nutrients and reducing the losses due to leaching. The positive effects of humic acids on the soil and on cellular metabolism determine a	

greater tolerance of plants to abiotic (e.g., salinity) and biotic (e.g., attacks of fungal diseases such as late blight) stresses.

2. **Algae:** They have been used for hundreds of years in agriculture as soil improvers to improve soil fertility. Algae extracts have been shown to act as biostimulants by improving germination speed, growth, fruit set, production, product quality, and resistance to environmental stress. In addition, they have a chelating effect; therefore, they increase the absorption of macro and micronutrients in different crops. The biostimulant effects are mainly due to the presence of phytohormones, polysaccharides, polyphenols, and other organic molecules.
3. **Protein hydrolyzates:** These are substances containing a mixture of soluble amino acids and peptides, generally obtained by chemical or enzymatic hydrolysis or mixed from animal or vegetable origin proteins. Protein sources are represented by leather processing residues (e.g., collagen), the fish industry, or vegetable legume biomass. The protein hydrolysates have properties as bio-stimulants, improving the absorption and assimilation of nutrients (e.g., nitric nitrogen and iron), tolerance to environmental stresses (salinity, drought, temperature extremes), and the quality of the product. It was also revealed that the protein hydrolysate could stimulate plant defense responses to stress. Protein hydrolysates can also exert an auxino-like action due to the presence of specific peptides that act as signal molecules and activate the biosynthesis genes of auxins in the plant. Protein hydrolysates can also indirectly influence plant growth by stimulating telluric microflow.
4. **Bacteria and fungi:** They can form a symbiosis with the plant, a relationship in which both the microorganism and the plant organism benefit. Among the best-known bacteria are PGPR (Plant Growth Promoting Rhizobacteria), growth-promoting bacteria comprising multiple species, while among fungi, they are mycorrhizae. Their presence allows for increasing the availability and absorption of nutrients, transforming insoluble forms into others available for the plant and capable of increasing root development.

The new REGULATION (EU) 2019/1009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 5 June 2019 has been published, which establishes rules relating to making available on the EU market fertilizing products, which amends regulations (EC) no. 1069/2009 and (EC) no. 1107/2009 and repealing regulation (EC) no. 2003/2003, which will come into force in July 2022 with the definition of plant biostimulant:

"An EU fertilizing product with the function of stimulating the nutritional processes of plants regardless of the nutrient content of the product, with the sole objective of improving one or more of the following characteristics of the plants or their rhizosphere:

	a) the efficiency of the use of nutrients; b) tolerance to abiotic stress; c) qualitative characteristics; or d) availability of nutrients contained in the soil or rhizosphere ". The limit values of contaminants allowed in a biostimulant of plants are specified, which must not be exceeded. Prior to 2019, some biostimulants were considered pesticides. In organic agriculture, Biostimulants are allowed and usable in reference to Annex I and II of Reg (EU). No. 2019/2164 in which the minimum admissible requirements are established, namely: Natural origin, no synthetic products, No GMOs, and no additives allowed in bio. In addition, the products marketed must have the words "Allowed in organic agriculture" on the label.
Aim of the best practices	Biostimulants foster plant growth and development throughout the crop's life cycle from seed germination to plant maturity in a number of demonstrated ways, including but not limited to: • Improving the efficiency of the plant's metabolism to induce yield increases and enhanced crop quality; • Increasing plant tolerance to and recovery from abiotic stresses; • Facilitating nutrient assimilation, translocation, and use; • Enhancing quality attributes of produce, including sugar content, color, fruit seeding, etc. • Rendering water use more efficient; Enhancing soil fertility, particularly by fostering the development of complementary soil micro-organisms.
Suggestion for implementation	In the defense and nutrition strategy of the plant, it is important to know the various natural mechanisms that are implemented and exploited by the plant to fight pathogens and sources of stress.
Expected Results	Knowing the existence of these products and possibly testing them on your own farms can be of great help, given the increase in soil pollution, the need to reduce production costs, the need to decrease the application of chemical fertilizers to the soil, and the number of field treatments. According to the data provided by the EBIC (European Biostimulants Industry Council), biostimulants are able to improve the absorption and use of nutrients by 5-25% and up to 15% of the intrinsic characteristics of the product (size, color, maturation, impact, resistance).
Improvable or Critical Aspects	To date, around 10% of EU farmers use biostimulants (source Ebic 2018). For this reason, it is important that this practice is spread within each country to better understand which are the best uses in the field and to evaluate the effects on plants and on the production itself.

	Biostimulant products help improve farmers' incomes by helping ensure that more of the nutrients applied to crops are actually used by crops. Farmers are also able to secure higher prices for their produce when crop quality is higher. Improved quality has a positive impact on storage and conservation, giving farmers more time to choose the best moment to sell their crops at advantageous prices. With the global population growth, the role that biostimulants play in fostering increased yields may help ensure that everyone can get enough to eat. Many biostimulant products currently on the market are adapted to the growing conditions in many of the transition economies in the EU's immediate neighborhood.
Bibliographic indications	http://www.biostimulants.eu/ Balducci Francesco. Uso dei Biostimolanti e induttori di resistenza in Viticoltura – Un possibile aiuto alla nutrizione e difesa della Vite. Università degli studi di Firenze. 2014 SILWER, Hanna. The effect of arbuscular mycorrhizal fungi and biostimulating algae extract on establishment, growth, and development of Vitis vinifera. 2020. REGULATION (EU) 2019/1009 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
References	EBIC (European Biostimulant Industry Council), Regulation (EU) 2019/1009, PAT
Pictures	 European Biostimulants Industry Council Biostimolante, prodotto da: Symbiagro S.r.L 

GOOD PRACTICE DESCRIPTION FORM		
Title	Vineyard Canopy Management	B.S.5
	Vineyard canopy management is employed to optimize yield, improve fruit quality, reduce the risk of disease, and facilitate other vineyard operations. These objectives are generally achieved by improving the microclimate of the grapevine through the use of shoot positioning, shoot thinning, hedging, leaf removal, and cluster thinning. These management practices can improve light interception, which promotes sugar accumulation and acid composition, improves phenolic compounds (for red grapes), reduces levels of methoxypyrazines, and improves the development of aroma and flavor compounds. Since light interception also affects bud development, fruit set, and berry growth, shading can negatively affect crop levels. Open canopies tend to have reduced disease pressure since improved airflow reduces humidity, which allows better penetration of fungicides and insecticides. Finally, vine vigor can also be controlled indirectly by management techniques—irrigation, fertilization, and floor management. **Vineyard Canopy Microclimate** The vine's microclimate comprises a number of factors, including solar radiation, temperature, wind speed, humidity, and evaporation. When the canopy microclimate is altered by canopy management techniques, it is not only sunlight levels that change but temperature, humidity, wind speed, and evaporation too. Therefore, variation in canopy microclimate has implications for grapevine yield, fruit composition and quality, and disease incidence. **Sunlight** A large canopy surface area well exposed to sunlight is desirable for biomass production and yield potential. In open canopies, the majority of leaves and a high percentage of fruit clusters are exposed, whereas, in denser canopies, a large percentage of leaves and most clusters are in the shade of the exterior leaf layer. **Temperature** Temperature can have a significant effect on shoot growth and fruit quality. Typically, as temperatures increase, the rate of shoot growth increases. However, high temperatures (> 90°F or 35°C) can decrease shoot growth by shutting down photosynthesis, leading to reduced sugar accumulation and reserves and rapid acid degradation (Spayd et al., 2002).	

Wind Speed, Humidity, and Evaporation

In an open canopy, humidity remains at or near ambient air humidity, whereas in a dense canopy, humidity can increase by as much as 10% as leaves transpire. Air movement within dense vine canopies is reduced compared to canopies that are more open. In very dense canopies, wind velocity can be reduced to only 10-20% of that outside the canopy (Allen, 2011).

Assessing Canopy Characteristics

Some of the more commonly used characteristics for assessing the canopy are shoot density, leaf layer number, shoot length, lateral shoot development, and pruning weight.

Shoot Density

Shoot density is defined as the number of shoots per linear foot of a canopy. A lower number of shoots results in an unnecessarily open canopy and a loss of yield potential.

Leaf Layer Number

Leaf layer number (LLN) is determined by the point quadrant method. In this method, a thin, straight metal rod is randomly inserted through the canopy in the fruiting zone, and the number of contacts made during each insertion is recorded. Multiple areas within the canopy should be assessed at least 50 to 100 times in order to get good, representative data (Smart and Robinson, 1991).

Shoot Length

Shoot length is another easily used characteristic. Shoots should be from 13 to 15 nodes long on low cordon systems such as the VSP (Allen, 2011).

Lateral Shoot Development

Lateral shoot development is an indication of vine vigor. Large numbers of laterals per shoot indicate high vigor levels and can result in excessive shading within the canopy.

Pruning Weight

Pruning weight, as discussed in the previous chapter, is a good indication of vine vegetative growth and can be used to determine crop load as well as the adequacy of the trellis system to handle vine vigor.

Techniques for Vineyard Canopy Management

Very few grapevine canopies fall within the preferred range of the parameters that characterize the ideal canopy. In areas with deeper, often somewhat fertile soils, normally abundant rainfall, and a long growing season, these factors combined with the vine's natural vigor may lead to very vigorous vines, often with very dense canopies. Excessive fertilization and/or over-irrigating may also result in excessively dense canopies. When this is the case, canopy management techniques such as shoot positioning, shoot thinning, hedging, leaf removal, and cluster thinning may help in opening up the canopy to expose the fruiting and renewal zones of the canopy to better illumination and air movement. These practices can have a significant impact on fruit quality and vine productivity both in the year they are applied and in subsequent years. If the canopy is naturally dense year after year, it may require changes in the trellis system to alleviate some of the crowdings.

Shoot Positioning

Shoot positioning is another important element of canopy management in the vineyard. Proper shoot positioning results in orienting shoots to create a uniform distribution of foliage that minimizes the shading of fruit. An added benefit of shoot positioning is that it makes other canopy management chores, such as hedging and leaf removal, easier to accomplish. It also improves the efficiency of operations such as pruning. Not only is shoot positioning important for the current growing season, but it also has an impact on productivity by encouraging the development of more fruitful buds for next year's crop.

Timing of Shoot Positioning

The best time to position shoots is one to two weeks post-bloom, when most shoots can be positioned without breakage and before their tendrils have secured the shoots to wires or other supports. On low-cordon bilateral systems, it is easier to do if the foliage catch wires are not in fixed positions but are movable and placed below the cordon level after winter pruning.

	Shoot Selection Shoots from the base of spurs, multiple shoots from the same node, and shoots growing from non-spur positions or originating in the head region or on the trunk are all candidates for removal unless needed to replace an old or poorly positioned spur or an old cordon. Usually, all sterile (unfruitful) shoots are removed during thinning. **Leaf Removal** Leaf removal is typically conducted in and around the cluster zone to allow varying levels of sunlight exposure and airflow. The objective of leaf removal is to have an average of one to two leaf layers remaining in the fruit zone after the leaves have been pulled. The goal is not to completely strip all the foliage from around the fruiting zone but to provide for between 40-60% exposure of the clusters (Allen, 2011). An adequate number of leaves must remain on the shoot to produce carbohydrates to support vine growth, fruit development, and ripening, develop overwintering reserves, and allow vine shoot and bud winter hardiness. This can usually be accomplished by removing a relatively small number of leaves from the vine in the area around the fruit clusters. Restrict leaf removal to those leaves positioned at or below the cluster on the shoot since those above the shoot are the primary source of carbohydrates for the developing cluster (Cantacuzene, 2007).

Cluster Thinning

Cluster thinning is a practice used to adjust fruit yields to obtain a balance between fruit and canopy to achieve optimum ripeness (See Figure 10.4). Crop thinning can be used to remove undersized, poorly set, or immature clusters. It can also be used to reduce bunch rot in tightly clustered varieties like Chenin blanc.

Timing of Cluster Thinning

Cluster thinning can be done at any time from pre-bloom through just prior to harvest. Timing is important because shoots and flowers (or fruit) are competing with each other for resources within the vine, and depending on when thinning is reduced, there may be different results for either the canopy or the fruit. Research suggests that pre-bloom thinning can lead to increased fruit sets of the remaining clusters and can potentially increase vegetative growth. In small or weak vines, removing crops earlier in the season may help improve berry development because there is less competition, allowing for more vegetative growth to support the berries through ripening.

Impacts on Fruit Quality

Crop thinning, when warranted, can help ensure that the fruit obtains adequate ripeness (Brix, pH, and titratable acidity).

Indirect Canopy Management Techniques

While direct canopy management practices can be used to modify the canopy, indirect canopy management techniques are also used to alter vine growth and canopy size, thereby affecting vine balance. For example, vines with a weak canopy typically require methods such as irrigation and fertilization to increase vine size relative to fruit yield, while floor management practices can be used to control overly vigorous vines. The following irrigation, fertilization, and floor management techniques can have strong impacts on canopy and overall vine growth and productivity over time.

	Vineyard Floor Management Vineyard floor management has multiple goals that encompass improving weed management and soil conservation, influencing desirable aspects of wine quality, and managing soil resource availability to control vine vigor. Cover crops have the potential to improve soil and vine health, can be adapted to many climates and soils, and may influence vine vigor by adjusting parameters such as the length of their growth period, coverage of the vineyard floor, and aggressiveness. In the case of excessive vegetative growth, (vigor) cover crops can be used to reduce vine vigor by competing for water or nutrients. **Fertilization** Most vineyards require some form of fertilization, whether it is macro- or micronutrient supplementation, for maintaining proper growth and fruitfulness. The decision to apply fertilizers should be based on visual observations of vine growth and interpretations of vine tissue analyses. **Irrigation** The main purpose of controlling the application of irrigation water to wine grapes is to produce high-quality fruit. Each vineyard can be very different in location (climate), soil-water capacity, vigor, and trellis design. Production goals may also depend on the variety and wine program to which the fruit is destined. Each of these factors, exclusive to irrigation, can significantly affect production and quality.
Aim of the best practices	To obtain a photosynthetic efficient, homogeneous canopy with uniformly and well-distributed shoots of similar vigor, producing healthy, high-quality grapes of a similar bunch and berry size and with a uniform level of ripeness.

Suggestion for implementation	**Practical criteria** It is evident that proper canopy management procedures should be integrated with the growth cycle and physiological demands of the grapevine. The physical structure, microclimate, and physiological functioning of the canopy affect grapevine performance and management as a whole. The development of the canopy has a physical and physiological bearing (also via microclimate) on the potential of the canopy for producing high-quality grapes. From research devoted to the functioning of and seasonal changes in the canopy and the berry (and grapevine as a whole), some practical criteria emerged that are needed for the establishment of highly efficient canopies that are able to support requirements for the longevity of the vine and the development of grapes that would eventually result in high-quality wines. Some of the most critical criteria that were established by considering vine physiology, viticulture, and oenology aspects and that are easily assessable in the vineyard are the following: - A well-balanced permanent structure - A vertically positioned canopy (or slightly inclined, depending on the trellising system) - A balance between older and younger leaves at the berry softening stage: a ratio of 0.7 - Well-exposed leaves (small sun flecks in the shade pattern of the canopy noticeable on the soil surface between rows) - Chlorophyll-rich interior-canopy leaves show no sign of early senescence - Approximately four-leaf layers from side to side in the canopy (from bottom to top) - Approximately 16 primary leaves on every shoot - Homogeneous shoot lengths (and vigor) of approximately 1.4 m - No active primary shoot lengthening in the post-berry softening period - Grapes exposed to filtered sunlight (20-30%) - Pests and diseases on grapes and leaves are easily controllable

Expected results	Depending on prevailing environmental conditions, a canopy that conforms to the above criteria will support high photosynthetic activity of leaves, predictable and continued budding, bud fertility and yields, high grape quality, and limited pest and disease occurrence, while vines can be easily mechanically harvested. Achieving such a canopy and manifesting the full potential of the vine into yield and grape quality without impairing longevity will require a total strategy involving well-selected and well-performed long-term practices (selection of site and soil type, soil mapping of planting site, establishment techniques, rootstock-scion combination, trellising and training system, vine spacing and row direction) as well as seasonal canopy manipulation practices (pruning, suckering of infertile and/or excessive and/or too short shoots, shoot positioning, tipping/topping, and leaf thinning). This should be accompanied by a comprehensive seasonal management strategy with a focus on the timing and the method of irrigation, canopy manipulation, and harvesting.
Limitation or Adaptability	It is very important and fundamental to monitor the seasonal trend to understand which are the best strategies to adopt for the canopy.
Bibliographic indications	Grape Grower's Handbook - A Guide To Viticulture for Wine Production. Ted Goldammer - Publication Date: March 2018
	Status of grapevine canopy management and future prospects (Papel actualy perspectivas futuras de la gestión del follaje). JJ Hunter, January 2002. Agricultural_Research_Council_South_Africa
References	Provincia Autonoma di Trento

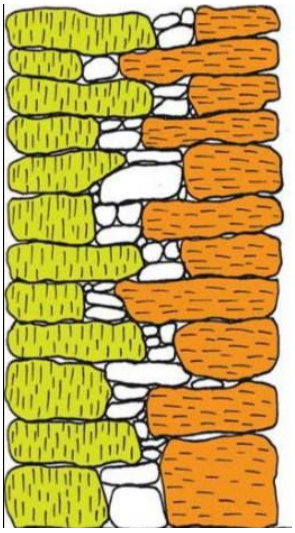
Pictures	 

GOOD PRACTICE DESCRIPTION FORM		
Title	Cover Crop	B.S.6
Short description of the practice	In viticulture, cover cropping refers to crop planting between the rows of vines in order to improve the management of the vineyard. Cover crops have been grown in vineyards since Roman times. Today, more and more vineyards across the world are practicing cover cropping in a different form, on a part or on the whole inter-row soil surface.	
Aim of the best practices	In a vineyard, cover cropping is mainly used as an alternative to herbicide use. Not only that, but the use of cover crops in comparison to herbicides benefits the environment; it also reduces vineyard expenses since the costs of seeding and maintaining cover crops are often lower. Apart from no herbicide use, cover crops improve the soil and vine management and the grape in the following ways: • Protect the soil from erosion; especially in the vineyards on slope terrain, they prevent soil from splashing. • Contribute to a better soil structure and increase organic content in the soil and with nutrients (nitrogen content) which are necessary for the growth of vines. • Improve the water-holding capacity of the soil. • Improve biodiversity in the vineyard since organic matter is a food source for several macro- and micro-organisms. Vineyards with cover cropping usually have a bigger population of earthworms, which are good indicators of soil fertility. • Improve fauna above the soil – cover crops can provide habitat and food for beneficial insects, such as generalist predators, parasitic insects, spiders, and mites. • Regulate vine growth and help to control the yield and quality of grapes and wine. According to the study made in Spain in the Rioja Alavesa region, with temporary use of cover crops, vineyards with cover crops shows a reduction in the water availability in the vineyard, which on the one hand, had a reduction of yield but had a positive effect through the reduction of vigor (positive as the disease susceptibility is reduced), as well as in an improvement of the quality parameters of the must and wine. Note that cover crops have less impact on a mature vineyard compared to young vineyards due to the fact that in a young vineyard, vines have a shallower root system that is competing with cover crops for water and nutrients. • Cover cropping reduces the vegetative vigor of a grapevine, and therefore it is susceptible to grey mold and downy mildew.	

Suggestion for implementation	There are several different cover cropping practices that winegrowers can choose from; they mainly depend on relative vigor, water availability in the soil, decisions on increasing or decreasing vegetative growth, and of course, pest management practices. Some of the possibilities include: Annually seeded and tilled cover crops: Cover crops are planted in the fall and then grown until spring when they are mowed and tilled into the soil to conserve moisture in the vineyard. In this system, some sorts of annuals that grow well during the cold months should be chosen, such as annual small grains (barley, oats, and triticale), winter peas, common vetch, bell beans, daikon radish, etc. There are two disadvantages of this farming system: it is tillage-intensive, and the soil is exposed to sunlight during the summer. **Non-tillage management with annual cover crop species – there are two possibilities:** - the vineyards are seeded with species that will reseed themselves on an annual basis, such as different clovers and/or grasses; - the vineyards are seeded with annual cover crops that are not self-reseeding, such as oats, barley, peas, vetch, etc. This approach is useful when tillage could cause erosion. Seeding is done in the fall, and then the cover crop is mowed and left to lie on the soil surface. Non-tillage management with perennial species – the following perennial species can be used in the vineyard as cover crops: fescue, turf selections of perennial ryegrass, pasture selections of perennial ryegrass, and orchard grass. Since many of the perennial grasses are very competitive with grapevine roots, they will have a big impact on vine vigor and are thus mostly used in vineyards with fertile soil. These cover crops are a good selection for vineyards that are prone to erosion or that need a reduction of dust. Also, native grasses can be used as cover crops. The good side is that grass does not require any special treatment – mostly just mowing. However, the native grass is not always competitive with the weeds. Therefore, when choosing native grass for a cover crop, wise pest management practice is crucial.
Expected Results	Cover cropping has several benefits for vineyard soil management; it improves the soil's physical and biological properties. With proper cover cropping techniques, winegrowers can even influence the quality and quantity of grape production. Since cover cropping is an alternative to herbicide use, it is a good practice for more environmentally friendly viticulture. However, it is not always easy for winegrowers to find a trade-off between the advantages and disadvantages of cover cropping, especially in regions with drought conditions, bad soil, and vineyards on steep slopes. Cover cropping should always be chosen according to the vineyard site-specifics, the style of farming, as well as yield and quality objectives.

Improvable or Critical Aspects	Apart from all the positive effects of using cover crops in the vineyard, there are also some disadvantages that winegrowers must take into consideration before sowing the cover crop. The need for specific equipment for sowing and maintaining cover crops requires different equipment for soil surface management in the inter-rows and under the grapevine rows. When vineyards are located on steep slopes, mechanization may be impossible. In the vertical vineyard, cover cropping can be more costly since special equipment is needed to manage cover crops under the grapevine rows. Cover crops compete for soil resources with the grapevine, such as nutrients and moisture.
Limitation or Adaptability	Legumes or cereals are a better choice for vineyard cover cropping. Since no vineyard is the same, this is merely a decision of a vinegrower. However, it is important to choose according to the costs of operations, vineyard site-specific, and farm management practices. In connection with that, it is good to know that the legumes' root system, in comparison to cereals and grasses, provides less organic matter. Vinegrowers can choose to cover crops only every second row, therefore with one row with the non-tillage system while every other row has a tillage system, and then switch the rows after a few years, or even mix different cover crops in the rows. There are endless possibilities. What is important to know is that over time, cover crops can develop pests and pathogens. Therefore, winegrowers should carefully rotate crops. Since some pests and disease-causing organisms are host-specific, crop rotation can help in controlling them. Note that cover crops need moisture for germination and good growth, so sow them in the fall prior to rain or in the spring. They also have a specific need for nutrients to grow well; normally, compost made of animal manure and grape pomace provides enough nutrients for cover crop and grapevine growth. At least every few years, it is good to make a soil analysis to make sure cover crops and grapevines get enough nutrients for growth.
Bibliographic indications	The use of cover crops in vineyards can help control the yield and quality of grapes and wine; Elhuyar Foundation, March 2010. Gestione del suolo in vigneto, l'integrazione delle tecniche. L. Valenti et al. L'informatore Agrario, 5/2014 Manuale di viticoltura sostenibile. M. Bottura, F. Penner, F. Ghidoni, 2014 https://www.noisiamoagricoltura.com/linerbimento-del-vigneto-il-segreto-per- viti-rigogliose-e-ottimo-vino/
References	Provincia autonoma di Trento

	Mulching in vineyard.

GOOD PRACTICE DESCRIPTION FORM		
Title	Maintenance of Traditional Elements of Winescape - Dry Stone Walls	B.S.7
Short description of the practice	The landscape is understood as a changing entity in which it is the infinite individual actions that define and modify places. Even the landscape, as a cultural asset, holds crucial values for our society and, at the same time, is subject to anthropogenic, environmental, and protected risks. However, a difference in the artistic heritage is the system in progress because it is linked to the dynamics of transformation and development of the context in which it is inserted. Agriculture in these areas, besides playing a role of primary importance for the protection and safeguard of the territory, has marked the landscape in a peculiar way, creating typical scenarios with a strong geographical and historical identity. These scenarios are the result of a slow and tiring integration that took place over the centuries between man and nature, which has led to an almost symbiotic degree of coexistence. Despite the significant imprint described in the epochs passed by the interventions on natural morphology, the artificial landscape has always been harmoniously inserted in the natural environment. Agriculture, while transforming very large areas, has exploited the direct productive capacities of the environment by intervening in the landscape in ways often compatible with ecological resources. The ecological sensitivity of this approach is evident if you look at the overall result: entire valleys or single, strongly transformed slopes are the result of individual works, implemented at different times and with different technical and economic capacities, but which are perfectly integrated with each other and in the landscape. Terraces, dry stone walls, ciglioni, artifacts, rural roads, and other types of construction today play a very effective functional and aesthetic role. This has made these landscapes a collective heritage to defend, maintain and enhance.	

	Dry stone walls are traditional masonry works that were carried out without or with little use of binders. The building materials were found locally and derived from the tillage of the land or came from the quarries (for example, Val di Cembra, Trentino). In some cases, materials derived from disused isolated houses or from entire abandoned settlements were probably reused. The construction system foresees a foundation made up of rather large and regular-shaped blocks on which several layers of coarse stones rest; for the infill and stabilization of the interstices, there are tessellations consisting of minute stones. The height varies according to the original slope, as well as the thickness that tapers towards the top. The dry laying ensures the drainage of rainwater. In part behind the wall is placed a counter-wall consisting of crushed stones of decreasing diameter, useful to facilitate the draining of excess rainwater and thus reduce the hydrostatic thrust of the embankment. The dry-stone walls don't constitute an isolated element, but they belong to a system, the terraces, an organization of the places founded upon physics, functional, symbolic, natural relationships, an expression of a unique coherence, single or collective, realized, integrated, and modified over time. Insofar as the safeguarding of the dry-stone walls, both in the theoretical formulation and in practical repercussion, a global look towards the whole system of the terraces is needed. The system of the dry-stone walls and terraces is not "static" but "dynamic," in accordance with the transformations of the soil use, according to the needs of the population, the demographic increase or decrement, and the climatic conditions. The three actions to be completed on the landscape synthesized by the European Landscape Convention (2000) and from the Orientations for applying (2008) are protection, directing the evolution of the places in order to transmit to the future generations their specific, material, and immaterial character without stopping time, neither to reconstruct places; management, to orient and control over time the process of transformation and planning, and innovative reading of the transformations happened over time. The roles of dry-stone walls can be explained as follows: • Hydro-geological: slope stabilization, water flow regulation • Agronomic: cultivation of steeply sloping land, land investment • Ecological: the proliferation of spontaneous flora and fauna • Cultural: heritage of technical, material, and natural characteristics of places, the transmission of knowledge and construction techniques • Historical: belonging to a community, local identity, and common good. The drywall and terracing system are not "static" but "dynamic," changing with land use transformations, the needs of the population, the increase or decrease in population, with climatic conditions. Every terrace, as every site, has its own specificity as an expression of the different ways the man-nature relationship is manifested over time: in this sense, the landscape coincides with the identity of places, and it can be safeguarded only if there is a common identity that sustains it. To transmit the meaning of this landscape, the involvement of the population is necessary.

Aim of the best practices	The reasons for maintaining and rebuilding these terraced systems are: • Conservation of historical/cultural heritage • Preserving the quality of the terraced landscape • Conserving the territory and avoiding the erosion of the territory resulting from the rains • The drywall is an ideal environment for the birth of flora and a refuge for multiple animals • These construction systems are totally ecological and 100% recyclable
Suggestion for implementation	The good construction of drywalls must necessarily respect some fundamental principles: 1. Building a good foundation (foundation stone)

	2. The choice of stones cannot be random; it must respect the type and coloration present in that territory (use of local material) 3. If the wall must support access roads or driveways, it must necessarily be designed and tested statistically by an engineer; in other situations, no project is needed (works carried out in the economy while always respecting the construction criteria of drywall correctly) 4. For all situations, apart from the closing walls (double-sided), it is mandatory to create drainage close to the wall; the greater the drainage, the greater the duration of the work over time. Drainage is performed by filling the back of the wall with all the small stones and all the processing waste; if they are not sufficient, it is appropriate to recover the dry scree from quarries in the size of 30/70 mm. 5. During the construction of the wall, maintain a slope or foot towards the mountain so as to counteract the pressure above the ground. 6. Avoid creating overlaps of all the same stones by creating vertical lines called "sisters" in jargon. 7. Finish the masonry work (headstone) with good-sized stones to ensure solidity and durability over time. 8. Create good drainage behind the wall structure. 9. In the construction of dry-stone walls, nothing is thrown away; all the stones are used, even the residual parts of the processing, which are used for drainage. The larger stones will be used in part of the wall. 10. As for the restoration or recovery of portions of walls, also, in this case, it is recommended to separate the larger and smaller stones and those that will be used for the crowning of the head, foundation, or visible edges. The drywall is a construction deformable over time and, if correctly built, has a very long life span, much greater than fake dry walls built with concrete. For their correct construction, courses on how to properly build drywall have been activated at an international level. There are two levels of training and courses on on-site safety.
Expected Results	The drywall is something alive; in fact, it moves, transpires, and photosynthesizes like an ecosystem, with high plant and animal biodiversity within it and ecological, environmental, and micro-climatic functions. They have a high degree of naturalness and environmental compatibility. 

	They present an identity value, an emotional and ethical value, and an ecological and environmental value.
Improvable or Critical Aspects	The layout of the slope areas (terraces, steps, ciglioni, lunettes) in a purely economic logic pattern presents several problems: • The low number of plants per hectare; • Reduced accessibility for operating machines and consequent difficulty in mechanizing crop operations; • Increase in the number of hours per unit of cultivated area; • Increase in production costs compared to agricultural areas in the valley; • High risk of abandonment following the contraction of the value of the various agricultural productions. In certain situations, such as in the case of part-time agricultural operators, with the cultivation of certain crops (first of all, the olive tree), the most important values are the maintenance of heritage or production for self-consumption; the cost-effective aspect is the maintenance of the ground arrangements, especially in the case of dry stone walls. Other advantages to consider in the construction of dry stone walls: • Cement is not used, and consequently, there is no special waste • No project or calculations are needed for most interventions (they are carried out economically) • No waste is produced • Use is made of local material, at 0 km, therefore no emissions
Bibliographic indications	Branduini P. Il ruolo dei muri a secco nella salvaguardia del paesaggio. Accademia dei Georgofili 2008 Rook Basile E. Strutture agrarie e metamorfosi del paesaggio. Dalla natura delle cose alla natura dei fatti. Giuffrè Editore, 2010 Savoi Ermanno (Maestro Artigiano). Muri a secco-Corso introduttivo di formazione teorico pratico. 2016 Spaini F. Indicazioni metodologiche per la trasformazione delle aree agricole di versante a nuove pratiche produttive. Provincia Autonoma di Trento 2013 http://www.accademiamontagna.tn.it/chi-siamo
References	Trentino School of Management (TSM), PAT

Pictures	 ELEMENTI COSTRUTTIVI DI UN MURO A SECCO DI CONTENIMENTO (O DI TERRAZZAMENTO) **Pendenza del muro** = dislivello piede-testa / distanza topografica piede-testa **Scarpa del muro** = distanza topografica piede-testa / dislivello piede-testa = 1 / pendenza 10-20% (5-10°) SUPERFICIE D'USO DEL TERRAZZO TESTA DEL MURO PARAMENTO (FACCIA A VISTA) ELEMENTI ESTERNI PIEDE DEL MURO RIPORTO DI TERRA Pietre di testa Pietre di elevazione DRENAGGIO RIPORTO DI TERRA Pietre di fondazione FONDAZIONE ELEMENTI INTERNI SUPERFICIE ORIGINARIA DEL VERSANTE
	 Val di Cembra

GOOD PRACTICE DESCRIPTION FORM		
Title	Green Manure in the Vineyard	B.S.8
Short description of the practice	This practice consists of growing annual plants between the rows and using them as green manure. This has a favorable influence on the physical, chemical, and biological characteristics of the soil, without affecting the growth and maturation of the vine. Depending on the type of soil and environmental conditions, the cover crops are generally planted after preparing the seedbed, a few weeks after the harvest (September-November), and mowed and shredded in the pre or post-flowering phase (depending on the needs). This is followed by incorporation into the soil with targeted sown plants. The choice of seed mix depends on the type of soil and is made using different types of families such as Legumes, Gramineous, and Cruciferous; in addition, a fourth cover crop useful for honey bees can be mixed with others, such as Phacelia.	
Aim of the best practices	To increase soil organic matter, to stimulate soil biological activity or to improve soil physical characteristics; to catch or keep valuable nutrients; to protect the soil from erosion; to interrupt pest and disease cycles; to manage weeds; to provide an additional food source for pollinators like honey bees.	
Suggestion for implementation	Every year, it is important to alternate the rows with the cover cropping and change the seed mix. By planting a mixture of cover crops, you will get all the advantages from each green manure crop. The best strategy is to work with several crops that have complementary root patterns for green manuring in accordance with your soil characteristics.	
Expected Results	Mature cover crops decompose slowly and generate humus (long-living organic matter) and enhance soil stability and soil porosity (due to the improvement of soil aggregation following the action of earthworms). Water retention and erosion protection will definitely be provided in the end, with a reduction of pathogenic infection from insects, nematodes, or other organisms. It keeps weed growth under control due to the huge competition with the cover crops.	
Improvable or Critical Aspects	To reduce the risks of pest outbreaks, enhance the natural resistance of vine plants, and increase the overall sustainability of the vineyard	
Bibliographic indications	Soil microbiota responds to green manure in organic vineyards. Longa CMO et al., Journal of Applied Microbiology, 03 Nov 2017, 123(6):1547-1560 La tecnica del sovescio per migliorare la fertilità fisica, chimica e biologica del terreno. Cantine Ferrari, 2011	
References	Autonomous Province of Trento, Fondazione Edmund Mach, Cantine Ferrari e Toblino	

Pictures	

Sovescio-Castel Noarna

GOOD PRACTICE DESCRIPTION FORM		
Title	Hand Picking the Grapes	B. S. 9
Short description of the practice	The choice of the manual harvest is fundamental for obtaining wines that, on the palate, are characterized by personality, character, and good aging potential. The mechanical harvesting of grapes, advantageous in terms of costs and timing, however, involves the presence of foreign materials, such as leaves, branches, and small pieces of bark in the must, which are used to alter the sensorial profiles of the selected wines. During the mechanical harvest, there is a greater exit of these elements from the berries, following their detachment from the stem and the crushing suffered during the harvest. The must formed is exposed to oxidative phenomena, responsible for the decrease in the polyphenolic potential. Furthermore, early mashing, especially in the presence of high temperatures, can favor the growth of spontaneous fungal flora, which is not always welcome due to the possibility of conferring Organoleptic defects on the wine.	
Aim of the best practices	The goal is to obtain a wine production that reaches the pinnacle of quality. The viticulturist must aim to obtain the maximum quality result; for this reason, the grapes must be harvested in perfect condition, both for ripening and for cleaning.	
Suggestion for implementation	Quality and typicality are two aspects that characterize and make a difference in a wine. The manual harvest allows you to make scalar collections to collect the ripest bunches and to choose the grapes in particular regarding their health status. A quality wine requires that the bunches arrive whole in the cellar. Finally, the manual collection represents the history, culture, and tradition of the area.	
Expected Results	The manual harvest is crucial to protect the quality of the harvest and obtain wines with important sensorial profiles. Only in this way can the wines be the portrait of the individual territory.	
Improvable or Critical Aspects	The manual harvest has a triple cost compared to the mechanical one. Where the low price is fundamental for the sale of grapes, the machine finds its ideal space. There are those who argue that tasting does not always distinguish wine from grapes harvested by machine from that obtained from grapes harvested manually. The judgment must, therefore, not be based on sentimentality regarding the type of collection. In fact, the manual collection is becoming a marketing topic, as it represents tradition and image. There are those who mention the manual harvest on the label, discrediting the "mechanical" wine. The "handmade" wine still enjoys appeal to the consumer.	
Bibliographic indications	https://giornalevinocibo.com/2012/09/15/vendemmia-manuale-o-meccanica/ https:// www.agraria.org/viticoltura-enologia/raccolta.htm Il vigneto trentino-buone pratiche in viticoltura. Consorzio Tutela dei Vini del Trentino, 2015.	

References	Consorzio vini del trentino, PAT
Pictures	 

GOOD PRACTICE DESCRIPTION FORM		
Title	High Nature Value Farming (HNV)	B. S. 10
Short description of the practice	The concept of High Nature Value (HNV) farming developed in the early 1990s from a growing recognition that the conservation of biodiversity in Europe depends, among others, on the continuation of traditional low-intensity farming systems. Many of Europe's most endangered habitat types and species are dependent on farming practices that have evolved in specific regions according to their specific environmental conditions. HNV farming is present in all European countries, with a diversity of types and extent. The cornerstone of HNV farming, and indeed of European farmland biodiversity, are semi-natural pastures, meadows, and orchards, as well as peripheral semi-natural features such as large hedges and copses. This semi-natural farmland provides a mosaic of habitats and an essential green infrastructure for wildlife. It is central to achieving effective ecological networks. Apart from conserving wildlife, these types of farming provide a multitude of other services for society, including ecosystem services such as carbon storage, clean water, wildfire prevention, storage of genetic diversity, and cultural values. These locally-adapted farming types provide much of the rich social fabric and character of Europe's landscapes. Not surprisingly, many unique agricultural products, such as numerous artisan cheeses or the acorn-fed jamón ibérico, originate in HNV landscapes. The link between HNV farming, biodiversity, and traditional landscapes is very strong, as many of the landscapes and habitats of biodiversity significance in Europe were created by the centuries-old practices of extensive grazing and low-input small-scale cropping. Replaced by expanding intensive agriculture in large parts of the territory, nowadays, HNV farms often operate in the most marginal agricultural land, under difficult social and economic realities such as in the mountainous regions.	
Aim of the best practices	High nature value (HNV) farmland defines areas in Europe where agricultural activities support and are associated with exceptionally high biodiversity. These areas are an important component of European agriculture not only for their natural values but also for cultural heritage, quality products, and rural employment. Such farming is practiced most frequently in areas where natural constraints prevent intensive production. They mainly, but not exclusively, involve low-intensity livestock farming.	
Suggestion for implementation	The assessment of the AVN areas refers to: 1) A high proportion of semi-natural vegetation; 2) Presence of natural, semi-natural, and structural elements of the landscape;	

	3) Presence of species of interest for the conservation of biodiversity at the European level. The analysis of the natural value for all three criteria sees the selection of the cover/land use classes with low management intensity as a preliminary step. The following land use classes are selected: rice, alfalfa, alternating meadows, land at rest or without crops in progress, vines, olive trees, nuts, permanent meadows, pastures, vegetable gardens, and orchards annexed to farms, and trees out of the forest. The selection only considers areas currently actively managed, including land at rest. The two classes referring to forage crops (permanent pastures and meadows) are considered the most suitable to meet the first criterion, while the other land uses have been considered in the application of the second criterion. The presence of these uses allows us to estimate a preliminary surface of potentially AVN agricultural areas. With the aim of distinguishing different degrees of natural value, scores are attributed on the basis of the following characteristics: the overall percentage coverage of permanent forages (criteria 1), the densities of two structural elements of the landscape (criteria 2), the trees outside the forest (in terms of percentage coverage) and the margins of natural and semi-natural environments (in terms of linear density measured in m/ha), and the number of species of threatened agricultural environments, reported for Natura 2000 sites (criteria 3).

Expected Results	Abandonment or degradation of farmland, intensification of production, and socio-economic decline are long-standing threats to such extensive and nature-friendly farming systems. The challenge is to increase the socio-economic viability of HNV farming while maintaining the natural values of HNV farmland, including ecosystem services provided to society.
Bibliographic indications	https://agriregionieuropa.univpm.it/en/node/3547 http://www.high-nature-value-farming.eu/what-is-hnv/
References	EU agriregion
Pictures	

GOOD PRACTICE DESCRIPTION FORM		
Title	Mechanical Inter-Row Weed Control in Vineyard	B.S.11
Short description of the practice	Mechanical inter-row tillage is a practice applied in vineyards for sustainable viticulture. In the past, weed control was manual, with limited mechanical tillage until the introduction of herbicide. The herbicide has drastically reduced the time spent on this practice and all the efforts put into it. Nevertheless, nowadays, herbicides are unsafe for humans and the environment, so it is necessary to find new practices that are more respectful. Mechanical inter-row weed control can be a good and correct alternative. To do inter-row tillage, three main types of machines can be used in different times and conditions: 1. EARTHING-UP/RIDGING/HILLING 2. HOEING OR HARROWING MACHINES 3. LAWNMOWER 1. EARTHING-UP/RIDGING/HILLING Earthing up the vines consists of bringing the soil back from the row to the plants in order to create a mound. This practice is used on young plants to reinforce the emission of roots, thus helping their growth but also protecting them from the cold. At the end of winter, frost will have rendered thinner this plowed earth and destroyed the weeds. Blades: they are knives that work inter-row, equipped with a movement regulation system. They penetrate the soil superficially by cutting and lifting the grassy soil. These blades cut the adventitious roots that will then dry out. This enables the soil to break up and helps separate the roots from the strip of soil. Discs: they are rounded, smooth, or toothed, which furrow the ground superficially close to the plant, removing the earth from the foot if convex or bringing it back if concave. It is an easy and fast operation.  Picture1. Radius SL Plus, Clemens. Blades with a disc. It can be combined with a rotary tiller.	

2. HOEING or HARROWING MACHINES

This tillage depends on the type of machine used, such as blades or a lateral translator.

This operation must be done in spring when there is a low presence of weeds. This practice does shallow work (15cm) and takes away the weeds.

TILLER OR HARROW: Toothed or blade harrows are implements made up of a series of triangular or square, circular teeth, or blades with rotational movement with respect to their vertical axis. The work done is due to the breaking action, in the case of teeth, or cutting, in the case of blades.

Picture 2. Rotary Tiller, Clemens

3. LAWNMOWER

Frequencies of this operation in a season depending on the kind of weeds present in vineyards and on the water available. The mowing of the grass is recommended in vineyards with high vigor, on land where the cutting of the grass does not include the movement of stones, and in vineyards arranged on steps or terraces, where there are erosion problems.

On the market, you can find different types of tools that mow the grass:

- **Wire brush cutters**
- **Trunk cleaner** (wire or cable ties) such as shoot removers. It can have double functions: vertical shoot removal and machines that have the main function of grass control.
- **Brushes:** they are tools constituted by a rotary shaft on which rubber wires are inserted which turn perpendicular to the ground to mow the grass. They are coupled to a lawn mower that does not affect the inter-row.

Picture 3. Wire Brushcutter

	▪ **Lawn mowers:** they have rotating mowers, blades, or knives that cut the grass. They can work close to the row or inter-row.  *Picture 4. VBC Shoot remover*  *Picture 5. BioSystem. Weed mower Aedes with Inter-row brushes*  *Picture 6. Inter-row lawn mower DB12*
Aim of the best practices	Inter-row tillage is very important to better tolerate water competition with permanent spontaneous grassing on all rows. In addition, it greatly improves the microclimate of the bunch, especially during ripening. This practice is fundamental to reducing the use of chemical weed management.
Expected Results	Improve the biodiversity of vineyards, reduce the pollution of herbicides, reduce resistance processes, aerate the soil and reduce erosion.

Improvable or Critical Aspects	Processing with these tools can bring stones to the surface, and in the center of the inter-row, there is a manual passage to remove as much as possible; this is necessary for the first period of use, after which the fact of removing them greatly reduces the problem.
	In addition, if brush cutters with plastic wires are used, the problem of releasing microplastics into the environment occurs in the long term.
Limitation or Adaptability	Limitation of HOEING: it is difficult to conduct the first pass with blades because of the soil condition, which is usually wet and damp. For this reason, it is good to do pre-unearthing or pass through with a lawn mower. Limitation of LAWN MOWER: the rapid consumption of the threads and the risk of shooting stones around due to the high rotation.
Bibliographic indications	Appunti per il vignaiolo naturale- 2014. Ruggero Mazzilli Gestione del filare per una maggior sostenibilità ambientale nella conduzione dei vigneti. Ferrari F.lli Lunelli SpA www.cucchi-ma.it/en/portfolio-items/interceps-tools-frame/ https://www.clemens-online.com/ https://www.bfmitaly.it/bfm-agricultural-machinery/
References	Provincia Autonoma di Trento, Cantina Ferrari, Ruggero Mazzilli

GOOD PRACTICE DESCRIPTION FORM		
Title	Sustainable Irrigation in the Vineyard	B.S.12
Short description of the practice	Precision irrigation aims to avoid wasting water. Currently, in Trentino, the vineyards are managed with drip irrigation systems, and the farmers delegate the control of the irrigation scheduling to consortia due to the considerable fragmentation of the properties that would not always allow control of irrigation at the level of the individual farm. The water supply strategy is scheduled with rotating irrigation turns. An agroecological practice is monitoring the state of the humidity of the soil and the available water for the vines for dose irrigation and to avoid stressful situations for the vines or to keep them in conditions of controlled stress. This requires placing simple and low-cost humidity probes in the soil of the vineyard, eventually coupled with robust and low-cost data loggers that measure soil moisture in real-time. In this way, by the good practice of monitors, with both the measures and a soil-water balance based on meteorological data, it is possible to irrigate at the right time and with a reasonable quantity of water without affecting the grape yield in terms of quantity and quality.	
Aim of the best practices	The aim is to measure the humidity in the soil and to visualize a soil-water balance so as to estimate the right time when there is a need to restore the water reserves, thus avoiding wasting water and, at the same time, maintaining the production targets in terms of yield and quality.	
Suggestion for implementation	The advantage of keeping the water content in the soil monitored is fourfold: a) it builds the elements for precise irrigation; b) it creates a community of farmers who are more aware that the water should not be wasted as it is a non-renewable resource; c) it allows vine-growers to discuss in a less confrontational way a commonly shared practice with other sectors of society, drawing on civil use, tourism, industry, etc.; and d) at the agronomic level, it avoids the surplus of water, stagnation, and damage to the root systems and excessive washout of nutrients in the soil.	
Expected Results	To obtain measures that have a practical utility for the management of irrigation, it is advisable to set up a measuring point to check the trends of the water content under the actual water management policies. The essential point is to have a meteorological weather station in the survey area. To convey the information to the wine growers in order to use the proposed agroecological practice, three levels for data management will be shown: a) the sensor on the ground; b) the measurement collection system; and c) the communication system for the progress of the data moisture in the soil.	

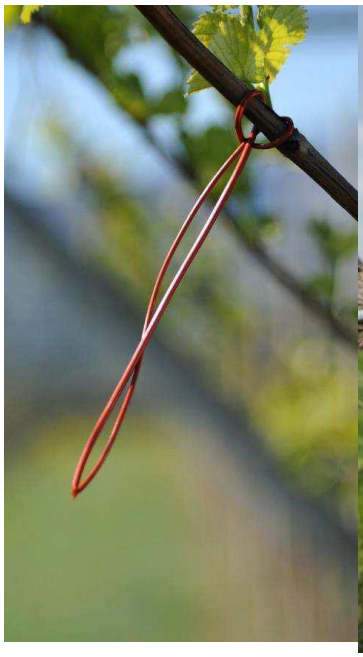
Improvable or Critical Aspects	We propose to use three types of commercial, low-cost, and robust sensors (with increasing complexity) to estimate the water content in the soil indirectly: a1) analogical water potential probes (tensiometer), the reading of which is done by the eye from a pressure gauge; a2) tensiometers which have an electronic reading system and which can measure with high frequency over time of the trend in the soil moisture; and a3) electronic resistive/capacitive sensors. In all these cases, good ecological practices also exist in the correct installation, maintenance, and control of the sensors.
Limitation or Adaptability	The measurement collection system similarly follows an approach of increasing complexity: b1) visual check of the value read on the pressure gauges and sending of the value read via Short Message System (SMS); b2) automatic reading and storage of data in low-cost and robust commercial data loggers to be used in the open field. Lastly, and similarly to what was previously proposed, the tools for the assessment of the water status of the soil will also follow an incremental approach: c1) communication by SMS, c2) notifications via Smartphone, and c3) WEB interface. The good practice is completed, where possible, with the installation of flow meters to monitor the water volumes used to irrigate, placed immediately upstream of the soil-moisture measuring point. Also, in this case, robustness and low cost will be favored by offering only mechanical and visual reading meters and electronic instruments.
Bibliographic indications	Zottele F. et al. GIADA, A DECISION SUPPORT SYSTEM FOR A DEMAND-DRIVEN IRRIGATION. Fondazione E. Mach di San Michele all'Adige. 2018
References	Fabio Zottele, Fondazione E. Mach

GOOD PRACTICE DESCRIPTION FORM		
Title	A Board Game To Identify the Perception of The Value of the Viticulture Based on the Landscapital	B.S. 13
Short description of the practice	It is now well established that the perceived value of the viticultural landscape can be transformed into a bonus prize for the wine. In the past years, we have investigated some territories that have succeeded in transforming this perception into added value for the wine, but we also found examples of how the landscape valorization has not benefited the income of the vinegrowers: the process has no guaranteed success. Our definition of *Landscapital* and the stemming method to analyze a productive landscape helps us to identify the drivers that build the perceived value for both the consumer and the vinegrowers at three different scales: the structural scale, the relational scale, and the ergonic one. From our investigations, we have noticed how many landscape promotion initiatives and policies prefer one scale over the other. But the success stories have been able to transform the beauty of the landscape into an added value for the vinegrowers, building a coherent, engaging narrative for the consumers of the peculiar characteristics of territory at these three different scales by using the process that we called *artealization* (in situ and visu).	
Aim of the best practices	We want to develop a board game in which two small groups of people, consumers, and vinegrowers, interact with each other by proposing and evaluating changes to the vineyard landscape and, at each turn, landscape promotional actions, maximizing their interests (the final score). In this way, we will, interactively, describe two scopes of values, thus identifying the characteristic elements of the viticulture (the landmarks, both physical and cultural) and the attitude of the productive territory to support the economic, environmental, and social forcings that lead to modifying the productive landscape. The game serves as a participatory tool in which the winemakers become consumers and vice versa; the consumers play the role of those who, with their daily work, constantly shape the territory by constantly changing the landscape, its perception, and therefore its economic potential. For our work, each play is a source of data and information to advance our research.	

Suggestion for implementation	The leader of WP3 (T2) has expressed his interest and opportunity to develop the proposed activity. Then we will start to develop the game for one project area (Trentino), developing definitions, rules, strategies, payoffs, and equilibria (alpha stage), and then test them with a group of voluntary beta-testers. We will then finalize the game with the help of a creative designer that will draw the table and the cards. In coordination with the project leader, we will identify a few events where some small groups of people will learn to play the Landscapital game and check if a series of shared values emerge between those who create the landscape and those who enjoy the landscape. Finally, we will conduct analyses of the results of the games played.
Expected Results	The game could become an operational tool to inform local political decision-makers on practical actions to enhance the landscape that is shared both by those who live in and create the landscape and those who benefit from it. There will be a presentation (oral or poster) at a national or international congress about Landscape or viticulture. There will also be one or more informative products for a larger audience.
Bibliograp hic indications	ZOTTELE F. AND GONZALEZ SANTANA: “Faraway, So Close!”. The landscapital proof-of-concept applied to the terraced landscapes of the Canary Islands and of the Alps. Fondazione Edmund Mach, Italy, and Universidad de Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, Spain. 2019
References	Fabio Zottele (FEM) e Provincia Auotonoma di Trento (PAT)
Pictures	

GOOD PRACTICE DESCRIPTION FORM		
Title	Mating Disruption	B.S.14
Country, region, contacts	Italy, Trentino, Unit for organic productions – PAT; federico.bigaran@provincia.tn.it; arianna.dallaporta@provincia.tn.it;	
Short description of the practice	This practice is adopted in agriculture to manage harmful insects. It is based on the use of pheromones. Pheromones are substances produced by insects and used for communication between individuals of the same species. They have several functions: sexual lure, aggregation, alarm, etc. Pheromones are reproduced artificially in the laboratory for monitoring and control of Lepidoptera. In viticulture, they are used for the monitoring and disorientation of vine moths (Lobesia botrana, Eupoecilia ambiguella Hb). This technique consists of the spread in the environment of pheromones that prevent the detection of the female by the male. The diffusion of the sexual pheromone takes place thanks to special dispensers and puffers that are installed on the plants simply by anchoring them to the branches. In the last years in Trentino, PAT promoted the diffusion of mating disruption that in 2005 was applied on 10,000 ha, almost the whole vineyard surface in Trentino. PAT financed a five-year financial aid program for farms approved by the EU.	
Aim of the best practice	To contain harmful insects in the vineyard and in the environment by minimizing the use of pesticides. Advantages: Reducing the use of insecticides, respecting the environment, protecting human health, reducing the risk of insect resistance to chemicals, qualifying farmers' activities	
Suggest ion for implementation	For the control of the population of the phytophagous agents, it is necessary to intervene promptly without having to deal with conditions that are no longer manageable. The first level of control is represented by the use of monitoring traps. These must be located in the center of the treated area and in areas deemed particularly at risk, such as the edges or in the upper parts of the slopes where it is more difficult to maintain the right level of pheromone concentration.	
Expected Results	Lack of mating will result in a much-diminished population of larvae and consequently less damage to the fruits.	

Improvable or critical aspects	The application of dispensers in the field must be carried out before the start of the flight of male insects of the wintering generation of the target species. Dispensers must be distributed as evenly as possible over the entire surface, subject to confusion, except in particular conditions such as, for example, in the presence of a non-flat area or in the presence of large plants, as seen previously. A reinforcement must always be provided on the first edge rows and on the first plants of the heads in order to compensate for the greater pheromone losses that occur in these areas.
Innovation	An innovative approach using the vibrational mating disruption method against leafhoppers (Scaphoideus titanus; Empoasca vitis) is currently being tested in open-field trials at FEM.

Bibliographic indications	Experience with mating disruption technique to control grape berry moth, Lobesia botrana, in Trentino. M. Varner, R. Lucin, L. Mattedi, F. Forno IOBC wprs Bulletin Vol. 24(2) 2001 pp. 81-88 Varner, M.; Mattedi, L.; Lucin, R. (2001). Mating disruption in Trentino viticulture: 10 years experience in Cantine Mezzacorona. IOBC/WPRS BULLETIN, 24 (7): 143-150. handle: http://hdl.handle.net/10449/18425 Nieri, R.; Mazzoni, V. (2017). Open-field vibrational mating disruption: the effect on leafhopper pests and the vineyard ecosystem. In: Future IPM 3.0 towards a sustainable agriculture IOBC-WPRS, general assembly meeting of the WGs Integrated protection in viticulture, Induced resistance in plants against insects and diseases and multitrophic interactions in soil, Riva del Garda, TN, Italy, 15-20 October 2017: IOBC/WPRS: 235-236. URL: http://www.futureipm3.eu/ handle: http://hdl.handle.net/10449/44200
References	Autonomous Province of Trento, Cantine Mezzacorona, Consorzio tutela vini del trentino, FEM-CAT
Pictures (3/3)	  

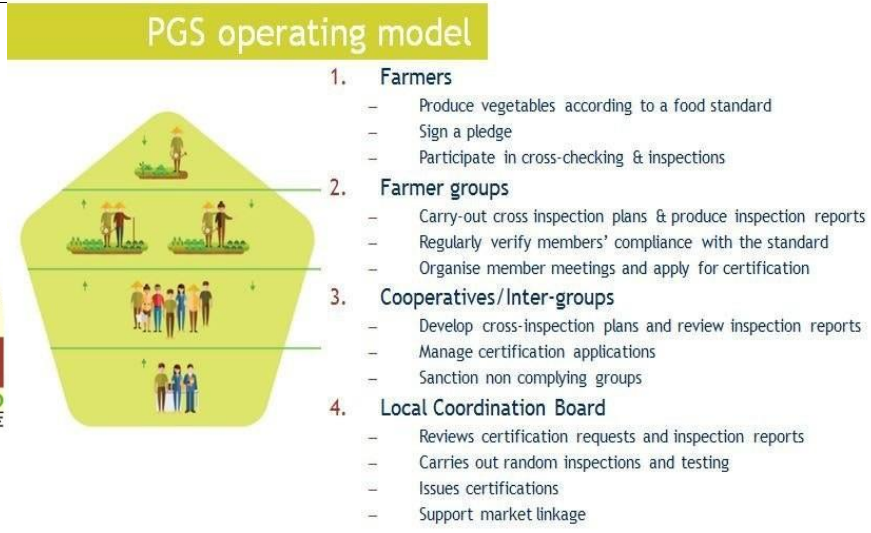
GOOD PRACTICE DESCRIPTION FORM		
Title	Mulching	B.S.15
Short description of the practice	Mulching is an alternative to chemical and mechanical weeding. It consists of covering the soil under vines in a way so as to not allow solar rays to reach the soil. This avoids the growth of other plants and allows the exclusive growth of the vine roots. Different materials can be used: ▪ Plastic film: it is drilled in points where plants are grown and has the advantage of being reusable in the next years. ▪ Gravel or stones: it can be good to maintain vines safe from the risk of frost, but also, the too high temperature of stones can arise and increase the evaporation of the soil. ▪ Biodegradable sheet: easy and fast biodegradation ▪ Organic matter: it maintains the soil moisture and keeps it fresh. It promotes good microorganism growth, and over time it decomposes and releases organic material into the soil and increases fertility and nutritional elements. ▪ The most common organic matter that can be used in these cases is hay, straw, leaves, and bark.	
Aim of the best practices	▪ Weed control ▪ Maintain soil moisture: this means water saving and hence less irrigation ▪ Shelter of the root system ▪ Keep soil soft in order to get a good result for vineyard cultivation. In fact, having covered soil means protecting it from compacting, pouring rain, drying from the wind, and limiting soil erosion. ▪ Enrich with organic matter: using natural mulching material has a fertilizer action, but it can't be substituted with fertilization	
Suggestion for implementation	In recent years, the use of compost as a material for mulching has been of great interest.	
Expected Results	Mulching allows you to control weeds, which in organic farming cannot be done with chemical agents for weeding; therefore, mulching saves a lot of manual labor. Furthermore, mulching can preserve the heat and humidity of the soil, protecting the plants and reducing the irrigation to be carried out, which is also positive on an ecological level. By applying mulches, water soil availability can be improved by reducing soil evaporation, runoff, and leaching. Several studies show that mulches help retain soil moisture and reduce evaporation and soil penetration resistance. Several different mulches exist on the market; some studies show that organic mulches (such as compost mulch, straw mulch, or rice-straw mulch) show better results in controlling soil water loss and thus improving water use efficiency compared to plastic mulches, as well as compared to bare soil or mechanical tillage. The vine shoots can also be used after the shredder.	

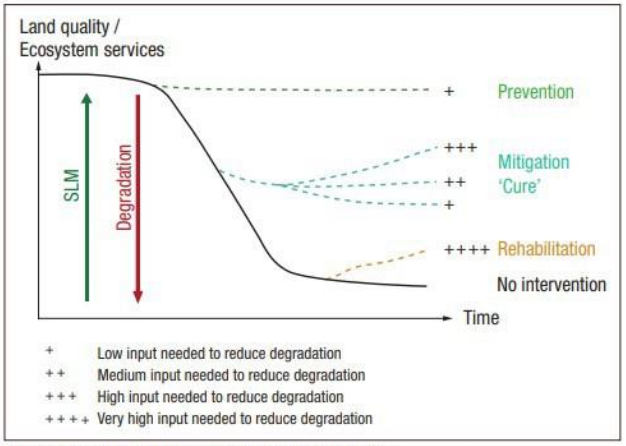
Improvable or Critical Aspects	The plastic material should be substituted as much as possible with other biodegradable materials to limit plastic use and reduce the micro-plastic problem in the environment, improving ecological matters. Mulch vs. compost: Mulch is organic or inorganic material placed on the soil surface as a protective cover. Compost is organic material that has undergone controlled biological and chemical decomposition. It is either applied on the soil surface or incorporated into the subsoil as a conditioner.
Limitation or Adaptability	Mulching can have some disadvantages, such as major costs compared to chemical weeding and an increase in some pests like earwigs, rodents, and snails under the mulching layer which becomes a shelter for these animals and can create difficulty for some practices, e.g., the harvest.
Bibliographic indications	https://www.ortodacoltivare.it/contatti/chi.html Plastic mulching for weed control and water economy in vineyards. A. Hegazi. ActaHortic.2000.536.28 The use of compost and mulch in vineyards. A case study from Torbreck Vintners, Barossa Valley Improving water use efficiency of vineyards in semi-arid regions. A review. Medrano H et al. Agron. Sustain. Dev. (2015) 35: 499.
References	Provincia Autonoma di Trento
Pictures (1/3)	Soil covered by hay mulching   Mulching with plastic film

			Gravel Mulching

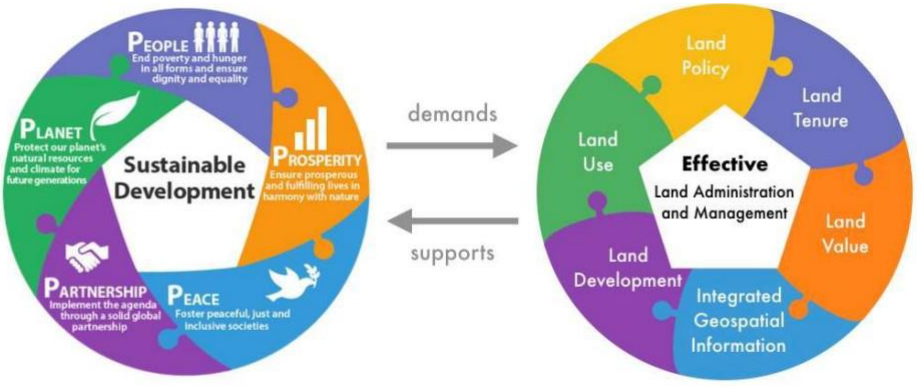
GOOD PRACTICE DESCRIPTION FORM		
Title	Participatory Guarantee Systems (PGS)	B.S.16
Short description of the practice	**Participatory Guarantee Systems (PGS)**, as defined by IFOAM, are "locally focused quality assurance systems. They certify producers based on the active participation of stakeholders and are built on a foundation of trust, social networks, and knowledge exchange." They represent an alternative to third-party certification, specially adapted to local markets and short supply chains. They can also complement third-party certification with a private label that brings additional guarantees and transparency. PGS enables the direct participation of producers, consumers, and other stakeholders in: • the choice and definition of the standards • the development and implementation of certification procedures • the certification decisions Participatory Guarantee Systems are also referred to as "participatory certification." The International Federation of Organic Agriculture Movements (IFOAM) and the organic movement remain a leader in the concept of PGS at the international level. IFOAM is running a program to recognize PGS in the organic sector. PGS is a tool that can be adopted not only for organic agriculture but is useful in various sectors.	
Aim of the best practices	IFOAM proposes an effective list of the key elements of a PGS: • shared horizon (vision): producers and consumers must consciously share the inspiring principles of the PGS; • participation: the credibility of the system derives from the active participation of all the actors; • transparency: all the actors involved must have adequate knowledge of how the system works, and not, therefore, a mere formal presentation of all the details (which may appear to be falsely informative, if excessively minute or technical), but an actual and substantial awareness of the main steps and the fundamental elements of the process; • trust: the system is based on the belief, widespread among all the actors, that producers act in good faith, and that certification is an expression of this trust; • learning: certification must translate into a gradual but permanent collective learning process, which strengthens the entire network involved (producers, consumers, technicians); • horizontality: all the actors involved in the PGS must share the same level of responsibility and competence in the process. The rotation of the offices must therefore characterize all the management bodies of a PGS,	

	pursuing widespread diffusion of leadership and responsibility.
Suggestion for implementation	In Italy and at the European level, there are several projects that have decided to adopt this good practice for a correct enhancement of the product. At the Italian level, Valoritalia is a company that has been a consolidated reality for many years and which operates in both the biological and integrated fields.
Expected Results	Like the "third party" certification systems (the traditional organic certification, managed by an external body), the PGS has the ultimate goal of offering consumers a credible guarantee that the products purchased meet certain characteristics, with particular reference to sustainability and social and environmental production methods. Unlike the usual certification mechanism, however, in this case, the active and direct participation of both producers and consumers is required: it is, therefore, necessarily a model applicable on a local scale by virtue of the explicit reference to direct relations between all supply chain actors.
Improvable or Critical Aspects	With these assumptions, participatory guarantee systems can represent a tool to improve the socio-economic and environmental conditions of the context in which they are applied by inserting clauses concerning the quality of work, integrity with respect to tax regulations, the health aspects of production, etc. The many studies on PGS have shown other positive indirect effects: • encourage the development of local markets for organic food products • encourage diversified production, avoiding a strong focus on monocultures, promotion and local safeguard of agro-biodiversity • encourage public awareness of local agriculture and facilitate small farmers' access to local markets • encourage the insertion of social justice rules and practices as an essential element of organic production systems.
Bibliographic indications	http://desbri.org/progetti/sistemi-di-garanzia-partecipata https://aisberg.unibg.it/retrieve/handle/10446/88974/162719/I%20Sistemi%20Partecipativi%20di%20Garanzia.%20Working%20paper%201-2017.pdf https://www.valoritalia.it/ https://ifoam.bio/
References	Provincia Autonoma di Trento, Valoritalia, IFOAM
Pictures	



GOOD PRACTICE DESCRIPTION FORM	
Title	Land Use Maintenance B.S.17
Short description of the practice	Among the most fundamental human behaviors is the occupation and employment of territory to gain a livelihood. Land use is the term that describes the patterns in the landscape that emerge from these activities. More formally, as the FAO describes it: *"land use is characterized by the arrangements, activities, and inputs by people to produce, change or maintain a certain land cover type. Land use defined in this way establishes a direct link between land cover and the actions of people in their environment."* Land administration informs the 'how,' the 'what,' the 'who,' the 'when,' and the 'where' of land tenure, land use, land value, and land development. Land administration is described as the process of determining, recording, and disseminating information about the relationship between people and land. Land administration is considered responsible when it continuously aligns processes and resources with the dynamics of societal demands. The term 'land' should be interpreted in the broad sense, also including water bodies (rivers, lakes, seas, oceans) and spaces above and below the surface, i.e., air space and subsurface spaces.
Aim of the best practices	The overarching goal of the Framework for Effective Land Administration (FELA) is to support global policy convergence in land administration, with a view to guiding policy development and policy operationalization in the Member States.  Figure 13: Stage of intervention and related costs. Effective land administration caters to all people and must: ▪ accelerate the proportion of the population with tenure security, ▪ develop confidence and trust, promote security, safety, peace, and peace building, ▪ promote efficient and vibrant land markets, taking into consideration aspects of land values and land development,

	▪ allow economic development through revenue systems that are equitable and fair, ▪ contribute to smart and resilient societies, ▪ cater to all circumstances, situations, and people, in times of peace and prosperity, and in times of stress and hardship (disaster and conflicts, migration and human displacement, poverty, food, and water scarcity), ▪ promote preparedness, resilience (with increasing climate vulnerabilities), sustainable consumption, and strong institutions.
Suggestion for implementa-tion	Decision support, upscaling SLM Land users, agricultural advisors, and decision-makers are faced with the challenge of finding the best land management practices for particular conditions. Thus, they have the same questions to answer: Which SLM technology and approach should be chosen? Where to apply them? How to apply them? Who plays what roles? What are the costs? What are the impacts? Do they improve food security and alleviate poverty? Do they combat land degradation/desertification? How well are they matched to a changing climate? Another fundamental question is where and when to invest: prevention before land degradation processes start, or rather mitigation/'cure' after degradation has started, or rehabilitation when degradation is most severe? The costs vary considerably depending on the stage of SLM intervention. Inputs and achievements depend very much on the stage of degradation at which SLM interventions are made. The best benefit-cost ratio will normally be achieved through measures for prevention, followed by mitigation, and then rehabilitation. In prevention, the 'benefit' of maintaining the high-level land productivity and ecosystem services has to be measured compared to the potential loss without any intervention. While the impacts of (and measures involved in) rehabilitation efforts can be highly visible, the related achievements need to be critically considered in terms of the cost and associated benefits. Questions that need to be addressed for informed decision-making are: Where are the hot spots/priority areas for interventions? Where are the green spots? These require answers in order to make decisions on spreading best SLM practices. In the following, a 3-step decision support method is proposed to help answer these questions based on improved knowledge management and a selection mechanism involving relevant stakeholders at different levels (Schwilch et al. 2009).
Expected Results	This 'Framework for Effective Land Administration' acts as an overarching policy guide and provides a reference for the Member States when developing, renewing, reforming, strengthening, or modernizing land administration and management systems. Specifically, the Framework seeks: ▪ To implement the Integrated Geospatial Information Framework for the land sector and support the achievement of the Sustainable Development Goals; ▪ To develop a comprehensive vision for understanding, advocating, and promoting effective land administration; ▪ To provide strategic guidance toward country-specific action plans to be prepared and implemented;

	▪ To advocate the continuous strengthening of land administration and management procedures, techniques, and tools; and ▪ To enhance multilateral partnerships through policy convergence in effective land administration with a view to guiding policy development in the Member States.
Improvable or Critical Aspects	The Sustainable Development Goals universally apply to all countries and mobilize efforts to end all forms of poverty, fight inequalities and tackle climate change whilst ensuring that no one is left behind. Considering that an estimated 70% of humanity does not enjoy secure land and property rights, there is a need to accelerate efforts to document, record, and recognize people in land relationships in all forms. Land administration relates people to land and informs on the 'how,' the 'what,' the 'who,' the 'when' and the 'where' of land tenure, land use, land value, and land development and should be appropriate, accessible and affordable and recognize social, economic and environmental circumstances at the national and sub-national levels. This Framework for Effective Land Administration, with its nine pathways, is an overarching policy guide and provides a reference for the Member States when establishing, strengthening, or coordinating their land administration and management system nationally or sub-nationally. The nine pathways provide a mechanism for effective leadership, advocacy, mobilization, and actions to accelerate efforts to document, record, and recognize people-to-land relationships in all forms and provide humanity with secure land and property rights.
Bibliographic indications	Framework for Effective Land Administration - A reference for developing, reforming, renewing, strengthening, or modernizing land administration and management systems. Expert Group on Land Administration and Management, United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) December 2019 http://www.fao.org/land-water/land/sustainable-land-management/es/ http://www.fao.org/3/i1861e/i1861e.pdf
References	Provincia Autonoma di Trento, FAO
Pictures	 *Figure 5: Sustainable Development and Effective Land Administration and Management*

GOOD PRACTICE DESCRIPTION FORM	
Title	Bird nests and shelter for bees and pollinating insects B.S.18
Short description of the practice	Bees are environmental sentinels and are very important for agriculture, food safety, and the health of the environment, which is why in this tab, we propose to include beehives in the vineyard. Artificial nests and shelters are a refuge for various species that will populate them in relation to their specific needs; some guests will use them to shelter during the cold season, while others will use them for reproduction, sheltering the eggs of the next generation. Each species should therefore be provided with the most suitable type of shelter, which will have to be dry, sheltered from water stagnation, winds, and exposure to the sun's heat. It is always difficult to predict which species and how many individuals will occupy the artificial shelter/nest, which is why it is useful to set up models that offer different types of housing in order to provide diverse environments to simultaneously meet the needs of different species. The structure of the nest can be more or less large and diverse: it can be a simple bundle of reeds tied together or inserted in a tin jar or a piece of wood with scattered holes of different sizes or be made up of a wooden frame, board style, equipped with different compartments filled with various materials pleasing to the different insect species. It is preferable to avoid nests/shelters that are too large that concentrate potential breeding and wintering places because the aggregation of many concentrated nests all in one place poses a risk as they promote the phenomenon of parasitism. A Dutch study by Dr. Rosita Moenen has shown how poorly designed insect nests and shelters can paradoxically cause an increase in deaths in solitary bees due to parasitism. They generally have the following characteristics: - The outer supporting and protective structure with (or not) compartments: Various materials can be used, both natural and recycled or reused: wooden planks; terracotta pots; PVC pipes (used in construction for eaves and pipes); plastic bottles, wooden boxes (ideally wine caskets), wooden pallets. Wood must insulate wintering insects from winter problems; it should never be treated with synthetic chemicals. Treatments with natural substances based on pine essential oil, trementine oil, and citrus terpenes are fine. The nests/shelters must also provide valuable protection from rain and weather, so it is important to pay special attention to the roof, which must be sufficiently large, durable, and waterproof. The lack of adequate shelter promotes the accumulation of moisture and, therefore, the development of mold potentially harmful to bees and other insects. The roof cover is with a sheet or corrugated fiberglass of adequate size and appropriately tilted with respect to the structure of the nest/shelter. - The filling materials: The organization and type of materials can be multiple with different characteristics while using the same materials, but they are still different. For the interior, that is, to prepare what will be the real accommodation for insects, they can use natural and artificial materials:

bamboo rods; marsh reeds; hollow stems of herbaceous plants, e.g., chicoria); branches from the soft or spongy interior, which insects can easily remove (e.g., elderberry, topinambur, umbrellas); logs (to be drilled); mud or clay loaves (to be drilled during drying); empty shells of snails; pine cones; straw or hay; dry leaves; and stones. Among the artificial materials and artifacts, the following can be used: bricks (to be drilled); corrugated cardboard; coppies and tiles; forts or tavellers; recovery timber (to be drilled); woven fibers; and newspaper. We do not recommend the use of plastic materials (e.g., straws or plastic bottles). It is suggested not to over-diversify the structure of the nest/shelter using many different materials to facilitate periodic maintenance, which is very important for the functionality of these artificial structures over time. Small structures with up to 3 different compartments filled with different materials are generally preferred to make the nest/shelter functional for different species, rather than a single large structure with many filling materials, placing different types of nests studied for different species in the same area by spacing them apart. To offer a diversity of functional accommodations to different species, it is important to make (or make available) holes of varying diameter and depth, using drill tips (wood for logs and wall for any bricks) of various diameters, 2-10 mm, making the holes in a uniform way on the chosen surface. When making the holes, it is useful to try to tilt them slightly upwards in order to facilitate, as much as possible, the exit of any meteoric water that should penetrate it.

Vineyards are a very important environment for different species of birds related to agricultural areas that use it as a nesting place and/or in the search for food. Another good practice and activity that is positive for biodiversity in the vineyard is the placement of nests and the implementation of practical particulates to promote birdlife. These animals are very useful for controlling parasitic insects, rodents, and parasites. Birds assist wine production in the same way as useful insects. The conservation and/or incentive of poultry in the vineyard can be implemented as follows:

- Maintain herbaceous bands in the gaps between the vineyards and alternately mow so that there are always non-mowed spaces in favor of entomofauna, which constitutes the feeding of insectivorous species. The vegetation should not be mowed entirely at the end of the vegetative period and therefore be maintained as an old grass band even during the winter.
- Protect or recreate between rows sparse vegetation areas and/or low and open soil, only partially covered, where species such as Common Redstart, Hoopoe, Twist, Black Cheekbone, and Green Woodpecker move and hunt more easily; e.g., keep free every second space between rows. The vegetation on the ground should present a wide variety of plants to provide an optimal food supply. Minimize the use of pesticides. Recent research has shown that some insecticides also have harmful effects on non-target species of invertebrates; the latter form a fundamental part of the diet of many bird species during the nesting period and are indispensable for breeding offspring (Hallmann et al., 2014).

	This study showed that trends in local bird populations were significantly more negative in areas with increased use of neonicotinoid insecticides (Hallmann et al., 2014). In the use of vineyard products, it is, therefore, necessary to be careful that they do not have negative consequences for biodiversity. Maintaining and incentivizing the presence of hedges and bushes are essential for different species. - Place nest crates, especially for Common Redstart, Torch, and Hoopoe, which can be a useful short-term measure. At the same time, in the medium and long term, however, the increase in natural cavities must be given priority. - Maintain isolated trees, fruit plants, capitalized trees, and even dead ones, as they are ideal sites for woodpeckers and, as a result, provide secondary cavities for many cave species. - Maintain and/or restore old dry-stone walls with niches that can be used as a nesting place by many species and/or perches for singing.
Aim of the best practices	Currently, the EU CAP does not take the necessary care regarding the health of bees and other pollinating insects. Over the past 30 years, more than 70% of the biomass of flying insects has been lost, belonging not only to the rarest species but also to the most common species on which the fundamental ecosystem service of pollination depends. This technique aims to reintroduce greater biodiversity into the vineyard by encouraging the proliferation of useful insects and pronouncements.
Suggestion for implementation	Main indications for the placement and management of nests/shelters for pollinating insects: The nest/shelter must be sheltered from the wind; the structure, however, must be built to not allow the wind to pass through it. It must therefore be equipped with a bottom or a back wall. Repairing the accommodation from excessive humidity: It should therefore be placed safe away from the rain (under a canopy, a pitch, eaves, or any cover) or equipped with a special roof. For this reason, moreover, when drilling the filling materials (trunks, bricks), it is advisable to drill upwards so that any rainwater that bathes them can flow more easily out. It is also useful, for the same reason, to try to tilt materials with holes (such as bamboo rods).

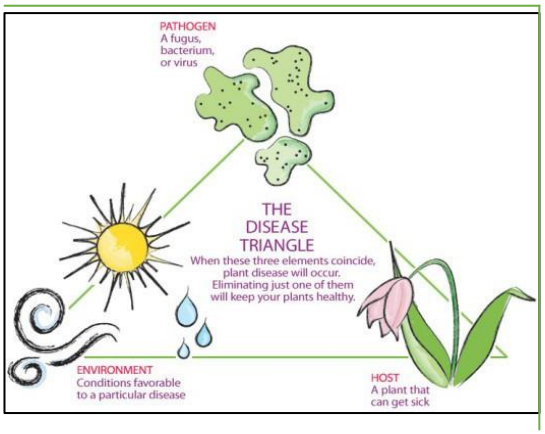
	The nest/shelter should be displayed preferably to the south or east; other exposures may affect their proper functioning because they will result in less heating of the accommodation. The nest/shelter should be placed at least 1.5m high, either on a tree or on a simple pole robust enough to hold the structure in a stable way and without vegetation that can obscure or hinder the tunnel entrances. The nest/shelter must be fixed solidly to prevent the wind from shaking or dropping it and ending up on the ground. Always take care to provide materials of various diameters so as to meet the preferences of the various insects, with a diameter of 2-10 mm. **Maintenance of artificial insect nests/shelters** Proper routine and periodic maintenance of artificial insect nests/shelters is a key aspect to ensuring their optimal functionality and preventing serious problems for the conservation of different insect species. Incorrect maintenance of nests/shelters risks not only making them no longer functional in a short time but can even turn them into deadly traps for the animals we actually want to help. When proper maintenance of artificial insect nests/shelters is not carried out, their parasites tend to accumulate very quickly and spread throughout the facility, increasing the infestation from year to year. In the absence of maintenance, even very serious infestations can be favored, which can seriously endanger the survival of host insects that can die during the development phase or otherwise strongly weaken the development. It is, therefore, extremely important to keep the accommodations for solitary bees and other insects that can occupy the artificial nest/shelter clean. It is useful to remember that the natural filling materials of "Bug Hotels" degrade over time and, at some point, must be replaced anyway, especially when it comes to wooden materials, which should never be treated with chemical impregnators.
Expected Results	The interaction of insects in the vineyard allows for increasing its biodiversity in order to obtain from this practice an added value that lies in raising awareness of the complex role that exists between the beneficial interaction of insect and parasite, i.e., the action that insects can provide as natural enemies against the parasites of the vineyard and also on the provision of ecosystem services. Production of honey, in the case of beehives in the vineyard, allows you to obtain a secondary source of income.

Improvable or Critical Aspects	If, despite all the attention to the realization, the artificial nest/shelter is not visited by any guest, usually because they are now too rare in the surrounding environment, it may be appropriate to make "catches" for its first "trigger." That is, in the propitious season (spring and late summer to early autumn), the nest/shelter is placed in another more suitable place (a quiet corner in a green area with greater biodiversity, a garden, especially one with the presence of nectar plants). After a few weeks, the nest/shelter that should have been colonized by the insects present is resumed, which we will bring back to the area to be colonized, ready to spread with the new breeding season. Checking if the nest/shelter has been occupied is very simple: just check if the entrance holes are closed by a mixture of earth that the insects use to shelter the eggs they have deposited in the cracks, and that will complete their development in the following months for the adults to fly at the beginning of the following spring. For the proper development and maintenance of useful insects, it is essential to plant species of plants in the vineyard that have positive characteristics for the survival and proliferation of these insects in the vineyard, plants with a good ability to produce nectar and be attractive flowers for pronubi insects (e.g., Facelia, Veccia, etc.). This is also due to the fact that the vine is a self-pollinating species with small flowers and not palatable to pronubi insects.
Bibliographic indications	Ferroni F. Piccola guida ai nidi e rifugi per api selvatiche e altri insetti impollinatori caratteristiche tecniche, posizionamento, gestione, analisi di mercato. WWF Italia Retallack M. Vineyard biodiversity and insect interactions - Establishing and monitoring insectariums. GWRDC Regional - SA Central. 2011 Scandolara C. e Lardelli L. L'avifauna nei vigneti ticinesi - Un confronto a 30 anni di distanza. 2017 Le api, sentinelle del vigneto per la tutela della biodiversità L'arena 28/01/2019 pag.18 https://www.youtube.com/watch?v=p3TuwX-1jKQ#action=share
References	Provincia Autonoma di Trento

Pictures	 Bird nests (top) and beekeeping in vineyard and nest for birds 

GOOD PRACTICE DESCRIPTION FORM		
Title	"Pyro-weeding" in Vineyards	B.S.19
Short description of the practice	The application of instantaneous heat is done using a flame machine carrying the burners on a side arm attachment frame, only one side, for treating one row in the vineyard at a time. The burners are placed at a distance of about 30cm from the plants; the flame is directed at the area that needs to be treated, including the trunk. The plants are kept free from weeds, growing underneath the row so that they have better growing conditions with an improved microclimate due to better ventilation and better exposure to sunlight. The treatment also maintains a clean area around the plants, avoiding the use of chemical herbicides and reducing the use of pesticides. Work speed is 3/6 km/h. A machine has been tested that runs with grape pellets, the width is 1,75m, so it can be used in intercropping of 2ms.	
Aim of the best practices	In vineyard management, instantaneous heat technology has been used for the mechanization of cultural practices, such as: 'Pyro-weeding' (flame weeding) to remove the weeds in the row area beneath the trees, either working a single row or both rows simultaneously, having an adjustable working width ranging from 30 to 60 cm underneath the crop row. 'Pyro-desuckering' eliminates the suckers and the waterspouts emerging from the latent buds on the trunk (causing the death of the apical bud of the sprout); thermal treatment (>100°C) applied as sanitation measures to control the dispersal of fungal diseases by directing the flames to the ground and the lower part of the plant trunk, to reduce over-wintering inoculum levels.	
Suggestion for implement ation	It is covered in organic and sustainable agriculture but is also recognized by NAP (National Adaptation Plans) as an alternative practice to chemical weeding.	
Expected Results	According to the manufacturer, in the first year of use, 3 or 4 interventions are necessary 20/30 days apart to see a lasting effect for the establishment of vegetation replacement constituted by Dandelion. In the following years, fewer interventions are needed; generally, two interventions are sufficient.	
Improvable or Critical Aspects	During the test, a second tractor had to be used, equipped with a water tank and hose to prevent the fire from spreading as the vegetation was particularly dry. In general, it has become clear that treatment with "pyro weeding" should always be carried out with damp vegetation, after rain or in the morning if dew is present, and it is inappropriate to use it in case of too dry vegetation due to the danger of starting fires. Any damage to the drip irrigation hose is possible if positioned at the bottom, near the ground. For this reason, it is always advisable to have water/fire extinguishers available in case they are needed.	
Bibliographic indications	Flame Treatment in Agriculture, R. Tomasone- Technical Report-October 2015 http://www.viten.net/tags/diserbo-e-infestanti/it/1027	

	Azienda agricola biologica “La Craizera” ditta costruttrice CS THERMOS- prova in campo19/03/2019
References	Provincia Autonoma di Trento, CS Thermos
Pictures	  

GOOD PRACTICE DESCRIPTION FORM		
Title	Decision Support System (DSS) to reduce pesticides in viticulture	B.S.20
Short description of the practice	**Plant Health protection:** Regarding humans and animals, even for plants, disease is a modification of the structure and functions of the organism that causes them harm. **The conditions required** The interaction between pathogen and plant evolves into disease in certain environmental conditions and through successive stages. It is, in fact, necessary that three conditions coexist, which, geometrically, can be represented with an equilateral triangle called the disease triangle. 1. Presence of a host plant or part of it susceptible to attack by the pathogen; 2. Presence of pedoclimatic conditions favorable to the attack of the pathogen; 3. Presence of a virulent pathogen.  *Photo credit: finegardening.com* The biological cycle of pathogens and pests depends on the environmental conditions (rain, moisture, and temperature) in conjunction with the optimal conditions; there is sure to be damage to the crop due to the proliferation of the disease. Plant protection products work and perform their correct action in relation to the following conditions: • **rain**: washout of the active principle (roofing products) • **temperature:** activity and persistence (sulfur, microorganisms, thermolabile substances) • **plant growth**: systemic products • **UV rays:** activity and persistence The susceptibility of a plant to disease varies according to its phenological stage.	

	Decision support systems (DSS) can simplify complex agronomic decisions and/or manage winery processes. Today many diseases and pest forecasting models are available, which take advantage of software or apps that can be downloaded from the internet and can be used directly from smartphones. The most popular DSS in Italy are Enophit by MPA solutions, GrapeDSS by Agricolus, Metos by Pessl Instruments, Rimpro, Vinesense, Vine.net by Horta, Susgrape, and Coptimizer.
Aim of the best practices	The goal is to reduce the number of treatments and increase their effectiveness, aimed at the main pathogens and parasites that affect the vine. They also allow estimating the risk, mainly by identifying the moment of infection or the intervention threshold.
Suggestion for implementation	The problem with these systems is the difficulty of accessing reliable weather forecasts. There is limited penetration in the DSS market, but there are good opportunities for the future.
Expected Results	The decision support system (DSS) is a decision-making process that guides the farmer to treat only if there is a risk of disease, to exceed the economic risk of damage, or when the fungicide can carry out the maximum effectiveness and with the most effective active ingredient.
Improvable or Critical Aspects	Limiting factors that are often found in the use of DSS: • They do not cover all parasites and pathogens • They do not predict accurately (reliability of the weather forecast) • They do not consider microclimate (in the weather forecast) • Some DSS do not combine treatments (more than one parasite/pathogen) • They do not give medium-term indications (reliability of weather forecasts) • They do not calculate the safety interval
Bibliographic indications	Pertot I. I sistemi di supporto alle decisioni in agricoltura e l'applicazione in EnoPhit. 2018 Prodorutti, D. et al. Coptimizer: a decision support system to reduce copper in organic viticulture. IOBC/WPRS BULLETIN, 36: 189-192 (2008) Rossi V. et al. Applicazione su larga scala del sistema di supporto alle decisioni vite.net® per la viticoltura sostenibile Istituto di Entomologia e Patologia vegetale - Università Cattolica del Sacro Cuore-Piacenza, Cormons (Gorizia), 2014 https://www.horta-srl.it/sito/wp-content/uploads/2019/01/DSS-il-volto-utile- dellevoluzione-digitale.pdf https://www.ita-slo.eu/it/susgrape
References	Università Cattolica di Piacenza, Fondazione Edmund Mach, Horta srl, Provincia Autonoma di Trento, SUSgrape Project

Pictures	


PATOLOGIE DELLA VITE
peronospora, oidio
BOLEZNI VINSKE TRTE
peronospora, oidij
METODO »TRADICIONALE«
»TRADICIONALNA« METODA
funghicidi
fungicidi
SUSGRAPE
• SZPO
• funghicidi
• biopesticidi
• SZPO
• fungicidi
• biopesticidi
ELEVATO INQUINAMENTO AMBIENTALE
VISOKA STOPNJA ONESNAŽENOSTI OKOLJA
AUMENTO SOSTENIBILITÀ IN VITICOLTURA
BOLJ TRAJNOSTNO IN OKOLJU PRIJAZNO VINOGRADINIŠTVO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GOOD PRACTICE DESCRIPTION FORM	
Title	Resistant grape varieties B.S.21
Short description of the practice	The two major diseases that require the most treatments in viticulture are downy mildew (Plasmopara viticola) and powdery mildew (Erysiphe necator). These fungi are not native to Europe but were imported with new varietals from Northern America in the 19th century. Viticulture in Europe was to be ruined completely also because of the phylloxera, which devastated vines at the same time. This is the reason why every year, traditional grape varieties have to be treated chemically 6–16 times, depending on weather conditions. Every time a wine grower treats his vines, he sprays chemicals on them, and this is how these substances end up in nature. According to an analysis by the European Institute of Statistics (Eurostat), viticulture covers 3.3% of the total agricultural area of the European Union and uses 65% of all fungicides used in agriculture. This means that the use of chemicals in viticulture is much higher than the same use in any other agricultural sector within Europe. In Italy, in 2013, Solaris, Johanniter, Helios, Prior, Cabernet Carbon e Cabernet Cortis were legally registered and authorized. These six new resistant vines have been created by the University of Freiburg and were tested by the research center of the Edmund Mach Foundation. In 2016, after 15 years of research by the University of Udine and the IGA (Applied Genomic Institute – Italy) and hundreds of crossing and thousands of examined plants, the first ten resistant vines were legally registered and authorized: Fleurtai, Soreli, Sauvignon Kretos, Sauvignon Nepis, Sauvignon Rytos, Cabernet Eidos, Cabernet Volos, Merlot Khorus, Merlot Kanthus, and Julius. Another fungus very dangerous for vines is Botrytis cinerea. The Edmund Mach Foundation has sectioned and registered four tolerant varieties to botrytis: Iasma Eco1, Iasma Eco2, Iasma Eco3, and Iasma Eco4.
Aim of the best practices	The aim was to combine good resistance to diseases and phylloxera of the American grape varieties with a high quality of European varietals. These are hybrid crossings between a European (Vitis vinifera) and an American (Vitis something else) vine. The American vines have much better resistance to fungal diseases; thus, using hybrids can reduce the need for spraying. In recent years, hybrids were made: crossings between Asiatic and European vines to induce resistance to cold temperatures.
Suggestion for	In order to produce good wine, it is advisable to plant these varieties not in the whole vineyard, but in some risk areas, e.g., close to residential or public green areas, places where it is difficult to carry out the treatments, e.g., on slopes.
Expected Results	Resistant grape varieties represent a good choice to do something against pollution and improve sustainable viticulture. In fact, these varieties represent a way to reduce chemicals and decrease soil pollution by also using less tractor machinery.

Improvable or Critical Aspects	Fungus-resistant grape varieties will not solve the problem of pollution. This does not mean that there may not arise any other challenges. This is because vines, if planted in monocultures, may also attract other vermin, such as insects or viruses, which again require treatments of some kind. Maybe one day, there will even be a mutation of the above-stated illnesses, which might once again lead to damage to resistant grape varieties.
Limitation or Adaptability	In European countries, it is still not allowed to produce DOC wines with resistant grape varieties.
Bibliographic indications	http://www.vivairauscedo.com/ https://www.piwi-international.de/it/ https://www.fmach.it/ http://www.vivc.de/
References	Provincia Autonoma Trento, Fondazione Edmund Mach, Vivai cooperativi rauscedo

DOWNY MILDEW AND POWDERY MILDEW RESISTANT VARIETIES (University of Freiburg):

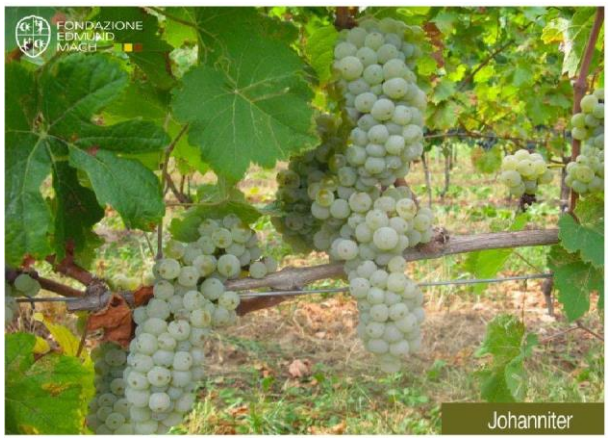
SOLARIS. As a constitution, the Solaris variety dates back to 1975. It is a Merzling x cross (Saperavi Severinyi x Muscat Ottonel). It matures quite early, and its white-berried grapes usually have high sugar content. The wine has a fruity bouquet that sometimes recalls pineapple or hazelnuts to the taste and has a good harmonious and alcoholic structure.
JOHANNITER. It is a white variety created in 1968 by Johannes Zimmerman at the State Institute of Viticulture in Freiburg. It is a cross between Riesling * [Seyve-Villard 12.481 * (Ruländer * Gutedel)]. It matures in medium season.
The wine has a delicate fruity note and is characterized by a grapefruit sensation, while the bouquet is intense and pleasant. The taste is harmonious, rather velvety, and full.
HELIOS. The Helios variety is obtained from the Merzling x Fr. 986-60 cross. This white-berried variety is medium early, has a medium-large bunch, and has a balanced vigor. The wine obtained has fruity notes, with a medium-bodied structure taste.
PRIOR. The red berry variety Prior (Fr 484-87) is the result of the cross (Joan Seyve 234-16 X Bl. Spätburgunder) X (Merzling X (Saperavi severnyi X St. Laurent)). It is a medium-late and very productive ripening variety. The wine has floral-fruity notes with medium structure and is recommended for vintage consumption.
CABERNET CARBON. This is a red-berried variety obtained from the crossing of Bronner x Cabernet Sauvignon. The ripening period is medium-late, and the wines have spicy-balsamic notes with a good structure and a good extract.
CABERNET CORTIS. This is a red-berried variety obtained from the crossing of Solaris x Cabernet Sauvignon, with an early maturing period. The wines have very intense fruity notes, a good body, and an elegant structure. This variety is suitable for producing good quality wines.


FONDAZIONE EDMUND MACH
Solaris


FONDAZIONE EDMUND MACH
Prior


FONDAZIONE EDMUND MACH
Cabernet Cortis


FONDAZIONE EDMUND MACH
Cabernet Carbon


FONDAZIONE EDMUND MACH
Johanniter


FONDAZIONE EDMUND MACH
Helios

Vivai cooperativi Rauscedo (VCR):

FLEURTAI®
Cultivar from the cross Tocai Friulano x 20-3 (code ud. 34-111)
Early ripening time. Resistance to diseases and adverse conditions: excellent resistance to downy and powdery mildew. Reduced sensitivity to botrytis and anthracnose. The aromatic profile shows a good intensity of volatiles with notes of white flowers as well as glycosides, providing notes of pear and almond, which are typical of the parent Tocai Friulano. The aromatic ampleness is mostly due to fruity and spicy aromas.

SORELI®
White cultivar obtained from the cross Tocai Friulano x 20-3 (code ud. 34-113)
Early ripening time. Resistance to diseases and adverse conditions: excellent resistance to downy mildew and good-to-excellent resistance to powdery mildew. Reduced sensitivity to botrytis, acid rot, and secondary diseases. The aromatic profile is intense with tropical notes, pineapple, and passion fruit. It resembles the parent Tocai Friulano.

SAUVIGNON KRETOS®
White cultivar obtained from the cross-Sauvignon x 20-3 (code ud. 76-026)
Early ripening time. Resistance to disease and adverse conditions: good resistance to downy mildew and fairly good resistance to powdery mildew. Reduced sensitivity to botrytis, acid rot, and secondary diseases. The aromatic profile of this variety is reminiscent of Sauvignon 108, so it is very fruity. It is conducive to the production of young wines or wines to be consumed after a brief refinement period.

SAUVIGNON NEPIS®
White cultivar obtained from the cross-Sauvignon x Bianca (formerly ud. 55-098)
Average-early ripening time. Resistance to disease and adverse conditions: good-to-excellent resistance to downy and powdery mildew. Reduced sensitivity to secondary diseases. Wines have a complex aromatic profile leaning towards floral-fruity with spicy notes and a good level of pyrazines that are reminiscent of Sauvignon.

SAUVIGNON RYTOS®
White cultivar obtained from the cross-Sauvignon x Bianca (code ud. 55-100)
Average ripening time. Resistance to disease and adverse conditions: good-to-excellent resistance to downy and powdery mildew. Sensitive to botrytis because of the highly compact cluster and tolerance to black rot. The aromatic compounds are superior to the average varietal and have tropical hints combined with a marked mineral scent.

MERLOT KANTHUS®
Red cultivar obtained from the cross-Merlot x 20-3 (code ud. 31-122)
Early ripening time. Yield: medium. Resistance to disease and adverse conditions: good resistance to downy and powdery mildew. Reduced sensibility to black rot, less to anthracnose. Sensitive to lack of magnesium. The aromatic profile is mellow and fruity with violet hints.

MERLOT KHORUS®
Red cultivar obtained from the cross-Merlot x 20-3 (code ud. 31-125)
Average ripening time. Yield: more than medium. Resistance to disease and adverse conditions: very good resistance to downy mildew and good resistance to powdery mildew. On average, they are sensitive to botrytis, acid rot, and anthracnose under conditions favorable to disease development. The aromatic profile shows evident notes of red fruit. The wines have an intense ruby-red color, slightly purple, with good structure.

CABERNET EIDOS®
Red cultivar obtained from the cross-Cabernet Sauvignon x Bianca (code ud. 58-083)
Late ripening time. Yield: medium-high. Resistance to disease and adverse conditions: good-to-excellent resistance to downy and powdery mildew. The aromatic profile shows intense floral-fruity and spicy notes with an excellent polyphenol profile for the quality and composition of tannins and for the intensity and tonality of pigments. It is conducive to wines of a medium to long refinement period.

CABERNET VOLOS®
Red cultivar obtained from the cross-Cabernet Sauvignon x 20-3 (code ud. 32-078)
Average ripening time. Yield: medium-high. Resistant to disease and adverse conditions: good resistance to downy mildew and fairly good resistance to powdery mildew. Reduced sensitivity to botrytis and secondary diseases. The aromatic profile is complex with intense fruity notes that are reminiscent of the parent, Cabernet Sauvignon. Suitable for the production of wines requiring medium to long refinement periods, also thanks to the high content of intense pigments.

JULIUS®
Red cultivar obtained from the cross-Regent x 20-3 (code ud. 36-030)
Average-early ripening time. Yield: medium. Resistance to disease and adverse conditions: good resistance to downy mildew and tolerant to powdery mildew. Reduced sensitivity to anthracnose. Enological potential: able to achieve excellent sugar and acidity accumulation in the must. The aromatic profile is very positive because it has an above-average concentration of floral and fruit notes.

For more details, we leave you the following link where you can find the technical nr. 18 report about Resistant Grape Varieties of the Vivai Ccooperativi Rauscedo. http://www.vivairauscedo.com/quaderni-tecnic

BOTRITIS CINEREA RESISTANT VARIETIES:
The red-berried varieties Iasma Eco 1 (Teroldego x Lagrein cross) and Iasma Eco 2 (Teroldego x Lagrein cross) have characteristics of remarkable rusticity towards bunch rot but also have a high content in anthocyanins and total polyphenols and an excellent sugar-acid ratio. From their grapes, we obtain wines with good body and consistency and with good content in tannins and aromas with a pleasant floral-fruity note.
The white grape varieties Iasma Eco 3 (Moscato Cross Ottonel x Malvasia di Candia) and Iasma Eco 4 (Moscato Cross Ottonel x Malvasia di Candia) are characterized by their different and complex aromatic content. From the first one, we obtain fresh, slightly aromatic wines that recall melissa and sage herbs with floral-fruity notes, medium-bodied and with good flavor, while Eco Iasma 4 can provide valid solutions and interpretations to late-harvest wines.

In the pictures below: IASMA ECO1 (upper-left) IASMA ECO 2 (upper-right)
IASMA ECO 3 (lower-left), IASMA ECO 4 (lower-right)

In June 2020, the Edmund Mach Foundation entered four new vine varieties tolerant to powdery and downy mildew. Two of those are red varieties (F22P9 AND F22P10: Teroldego X Merzling)) and two are white varieties (F23P65: Merzling X FR993-60 AND F26P92: Nosiola X Bianca).

GOOD PRACTICE DESCRIPTION FORM		
Title	Social Learning and Knowledge Generation in Agriculture	B.S.22
Proposer subject	Provincia Autonoma di Trento (PAT)	
Short description of the practice	Agriculture does not represent a natural factor of production and employment but, rather, is the result of intentional choices that have long sought to reduce costs at the expense of working conditions and long-term sustainability. Then the economic crisis was weighed, which pushed to look for agriculture as the solution to work and subsistence problems: in Italy, between 2010 and 2012, the agro-food industry increased exports by 20%, reaching 33,6 billion euros. The growing presence of non-national workforce fields, in the form of occasional and/or seasonal work, contributed to the change of perspective. Based on an important study, which began in the OECD area in the second half of the 1990s, the potential of agriculture emerged in offering production opportunities as well as leisure, growth, and above all, healthy living. It is also necessary to see innovative, different agriculture, aware of its repercussions on the landscape and the environment, attentive to the relationship with work, and capable of attracting young people. In all this, the care of the territory and the competitiveness of local agro-food systems are fundamental, where the ability to cooperate has allowed or could allow effective improvements. An overall reorganization of the sector with a view to improvement requires the integration between the various realities in order to produce foods tailored to increasingly specific needs, respect and promotion of the eco-systems, and knowledge of the past, representing a great opportunity in all the country. In this sense, social agriculture can be an excellent driving force for growth and ethical, social, and economic protection. To date, there is no specific policy for social agriculture, but it is possible to reconstruct a framework of the main regulatory provisions as well as in terms of development policies affecting this activity. The experience of Social Agriculture concerns the conduct of production activities according to eco-compatible methods. There is, in fact, a natural convergence between the pursuit of social purposes and respect for the environment. Both these orientations find a common root in the assumption of a form of responsibility towards the community: social responsibility on the one hand and environmental responsibility on the other. As we have already seen above, the perception of the effectiveness of one's contribution, even if limited only to a small segment of the production process, is, in fact, deeper and gives a greater sense to one's commitment when producing a food ready for consumption, whose importance and usefulness is immediately felt. Producing food goods also brings the experience of Social Agriculture closer to citizens, both when they go directly to the farm to obtain supplies from the company sales point and when they frequent other specialized sales places (social	

	'cellars,' solidarity markets, etc.). Social agriculture should not be confused with subsistence agriculture that characterized the campaigns before the advent of capitalism but is a direct consequence of the industrial development of the primary sector. In reality, many agricultural companies totally dependent on industry have been involved in the evolution of the agri-food sector and are often being overwhelmed. The surviving companies are those that have not completely embraced the market logic, developing diversification mechanisms and binding themselves firmly to their territory. These companies have gained the competitive advantage of combining past, present, and future knowledge with a view to continuity. Within this "agricultural knowledge," the extremely varied situation of social agriculture develops, made up of different initiatives with a social value and difficult to insert into a unique and exhaustive mapping. Generational transmission in the social sphere, that is, in that widespread environment of life that goes beyond the family sphere, educating and being educated, derive from direct experience, from the things that happen in the here and now, but also derive from the narration of one's own and others' pasts; in relationships, there is, in other words, a learning deriving not only from the direct and actual experience of the relational experience but also from the relationship with the memory of others with whom one enters into a relationship with their explicit individual and/or collective history in the present, albeit with all the reworkings that the present makes on the past. Within this relational perspective, there are possibilities of continuity as well as of "vertical" narrative interruption, that is, between people who belong to different cohorts/districts and who find, or do not find, meaning in activating relationships and actual possibilities to do so. Being placed in continuity within a story, which is considered legitimate to have been, and to continue, means believing that there are contents that are worth transmitting, indeed with respect to the question about their validity and landscape from one generation to another: it is a given, an automatic process, which does not even reach the awareness of being an educational act, indisputable because not it is discussed, and not subjected to any critical examination. It is precisely this kind of generational transmission connected to the transmitter's memory that today is experiencing critical dimensions due to the radical changes that have occurred in recent decades. These are experiences and memories that risk not being able to be accepted, certainly not because of the recipient's lack of sensitivity or because they are not very functional (if not as a testimony) for the learning needs of subsequent generations, but because the scenario within which it belongs has completely changed, where they could be placed and be hosted.

Aim of the best practices	Social agriculture has consolidated itself as a widespread practice in the Italian agricultural and rural fabric, combining the elements that have always characterized it (inclusion, legality, conscious use of the land, attention to the environment, etc.) with the different needs of contexts and people. In many cases, it represents a virtuous example of innovative welfare, committed to providing answers, on the one hand, to needs for social and labor inclusion and, on the other, to the need to provide services, particularly in rural areas. The objectives to be achieved are the sharing of common values, within the project areas, with the aim of being extended in the future to the entire wine and territorial community. Furthermore, social agriculture activities understood as new local welfare models can be considered strategic tools of knowledge and rural development. There are numerous factors connected to their implementation, and they range from food production to the management of territories and their resources, from the creation of economic value and new employment to the organization of innovative services which, in various capacities, complement and supplement those offered by the state. In this sense, social agriculture can be an excellent driving force for growth and ethical, social, and economic protection. To date, there is no specific policy for social agriculture, but it is possible to reconstruct a framework of the main regulatory provisions and in terms of development policies affecting this activity.

Suggestion for implementation	In order to become a real new participatory welfare model without losing its original characteristics, Social Agriculture should develop through actions on several fronts, to be implemented in the various regional realities, together and in agreement with the operators, and aimed at strengthening the knowledge system, consolidating experiences, enhancing interactivity between public and private operators and developing service actions for the systems that are built. First of all, the consistency and characteristics of the existing realities in the various territories of our country should be studied in depth. At the same time, the scientific results of the social impact deriving from the use of agro-rural resources in rehabilitation processes should be collected. It would be necessary to train skills in the management of agricultural practices among social workers and, conversely, to transmit knowledge concerning the management of rehabilitation methods among agricultural workers. These initiatives should be accompanied by forms of group interaction between system operators in order to refine and exchange acquisitions and experiences. The interactivity between public and private operators should also be promoted by defining specific memorandums of understanding and specific organizational systems aimed at the integrated management of insertion paths. The system service actions would, finally, be ensured by supporting the development of joint projects and the dissemination of experiences and good practices. By systematically involving the protagonists, it will be possible to enhance the experiences in progress without eroding their characteristics of originality and innovation. It is a question of jointly safeguarding both the motivational and professional aspects on which the existing initiatives are based and, at the same time, affirming the public utility of these practices. Innovation in the agricultural field and the spread of multifunctionality can find new impetus of authenticity in paths that place agricultural activities at the center of inclusive dynamics, of projects that pursue solidarity, shared "good economies" consistent with the identity of the territory, and bringing this heritage also to future generations.
Expected Results	• Improve the competitiveness of the agricultural and forestry sector; • Enhance the environment and rural space through land management; • Improve the quality of life in rural areas and promote the diversification of economic activities
Improvable or Critical Aspects	Critical aspects: good practices in social agriculture tell us that, where synergy is created between institutions, associations, and companies or between a group of highly motivated people, it is possible to achieve truly appreciable results from every point of view. However, practice confirms that, in starting a social agriculture project, despite the strong motivation, some farmers encounter obstacles that are not easily overcome. The absence of specific skills in this area, the lack of capital, and the lack of support from institutions often lead to many projects remaining unfinished. For this reason, referring to successful examples can inspire, clarify ideas and provide concrete suggestions so as not to remain inactive.

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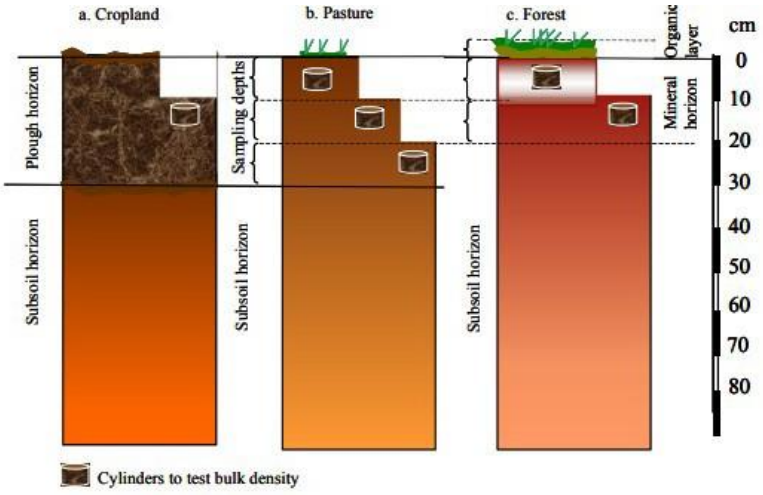
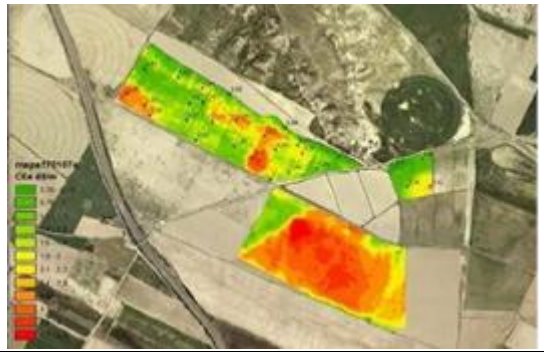
References	Provincia Autonoma di Trento (PAT), Rete rurale nazionale
Pictures	 

GOOD PRACTICE DESCRIPTION FORM		
Title	Soil Fertility Monitoring	B.S.23
Short description of the practice	Soil quality control is important to prevent degradation, contamination, and loss of fertility. Soil is the third environmental compartment to be protected in the future, together with water and air. Soil is indispensable for human survival and, at the same time, subject to its activities. If soil knowledge is the primary activity to develop tools for assessing their health, monitoring is engaged in this process to provide useful information to understand the changes over time of the most sensitive characteristics. It is important to identify representative sites of the soils in the predetermined area and to prepare periodic surveys according to recognized methods, to follow the changes induced by natural phenomena or by human action. At the international level, Soil Monitoring means the systematic determination of soil variables in order to highlight changes over time (FAO, 1993), while the Soil Monitoring Network means a set of sites/areas where changes in soil characteristics are documented, through periodic analyses of a set of specifically chosen parameters, carried out with common methods.	
Aim of the best practices	Proper execution of monitoring activities involves investigations that aim to determine and seek: • The concentration of heavy metals in the soil, to verify the natural or anthropic content of the various compounds in the soil. • The concentration of organic micropollutants (dioxins, PAHs and PCBs) in the soils of the Veneto region to assess the spread of these ubiquitous substances in our environments and indicators of pollution caused by man. • The biological quality of the soil for an assessment of soil biodiversity • The content of nutrients (nitrogen, phosphorus, and potassium) in plots of ordinary agronomic order, fertilized with farm effluents as they are or as treated, in order to test the effect of these practices on some soil parameters. • Based on the Soil Analysis, it is possible to draw up a fertilization plan that optimizes inputs and ensures maximum productivity and profitability at the agricultural soil level.	

Suggestion for implementation	A detailed examination of the systems of monitoring, observation, and management by means of GIS and cartography existing in the member states and in those in the access phase has allowed us to reach an exhaustive knowledge of the information systems on the soil existing in Europe. The generalized adoption of GIS technology and the creation of georeferenced soil databases have allowed the development of new types of evaluation from which much more relevant information can be obtained for decision-makers compared to the soil maps available until a few years ago. Using these databases with appropriate processing, it is possible to derive information on the risk of erosion, the content in organic matter, diffuse contamination, compaction, and salinization, depending on the characteristics measured. The availability of these databases is a necessary pre-condition for the development of a soil monitoring system.

Expected Results	COM 179/02 has identified eight main threats to the soil that corresponds to as many degradation processes: 1. erosion, 2. decrease in organic matter, 3. contamination, 4. cementation (i.e., ground cover by means of infrastructure or buildings), 5. compaction, 6. decrease in biodiversity, 7. salinization, and 8. hydrogeological risks (floods and landslides). The results expected from this good practice are the improvement and reduction of the threats mentioned above. The ecosystem services provided by the soil functions are manifold, including the regulation of the microclimate, the regulation of water, the mitigation of pollution, support for biodiversity, and carbon storage. Good agricultural practices can also improve the fertility and biodiversity of soil over time, which is why during the Ecovinegoals project, some fundamental parameters will be monitored to demonstrate how the practices adopted to improve the quality of farm soils.
Improvable or Critical Aspects	Monitoring must be carried out in such a way that it is as representative as possible of the pilot area. The representativeness of the monitoring sites is assessed on the basis of: • The type of soil in relation to the different food and nature and/or climatic environments; • Land use; • Agronomic management; and • The present threats and risks of degradation. In particular, by type of soil, reference is made to: • The functional behavior of soils in relation to the main degradation and pollution processes; • Taxonomic classification (soil taxonomy, world reference base), trying to group similar soils as a result of the different factors of pedogenesis (climate, plant and animal organisms, morphology, mother rock, time); and • The soil-landscape and soil-climate relationships that influence the behavior of the soil, especially with respect to the functions it performs. The monitoring site is defined as the surface of the territory in which soil characterization and sampling operations are carried out. The monitoring site is a homogeneous area from the point of view of the type, use, and management of the soil. It is, therefore, necessary to correctly identify the monitoring site as a homogeneous management area, i.e., that part of the company surface for which it is believed that for environmental elements (morphology, texture, color, soil structure) and for common cultivation practices (irrigation, deep processes, fertilizations received and alternations), soils have similar chemical and physical characteristics and are subjected to similar anthropogenic pressure. The monitoring campaigns are repeated after some time and possibly in the same period of the year. For some parameters, a double seasonal sampling,

	usually, one in spring and one in autumn, is foreseen in the same sampling campaign. As a rule, monitoring is repeated at least every five years. In addition, the execution of correct sampling in the field is essential for obtaining real and representative data.
Bibliographic indications	APAT. Elementi di progettazione della rete nazionale di monitoraggio del suolo a fini ambientali. Aggiornamento ottobre 2004. A. Orgiazzi et al. LUCAS Soil, the largest expandable soil dataset for Europe: a review. 2017 Citations: 56. This paper was invited for the 70th Anniversary of the British Society of Soil Science. https://www.arpa.veneto.it/servizi-ambientali/comunicazione/parliamo-di../monitoraggio-dei- suoli file:///C:/Users/pr44818/Downloads/MANUALE_CAMPIONAMENTO_MONITORAGGIO_SUOLO%20(1).pdf https://www.semanticscholar.org/paper/Soil-Sampling-Protocol-to-Certify-the-Changes-of-in- Stolbovoi-Montanarella c02365c4f0d31bcdf2ef9209ed82c080a0cde505 http://ctntes.arpa.piemonte.it/pubblicazioni/TES-T-MAN-04-02_testo.pdf HTTPS://PUBLICATIONS.JRC.EC.EUROPA.EU/REPOSITORY/BITSTREAM/JRC32323/ EUR21576.PDF
References	Provincia Autonoma di Trento, ARPA Veneto
Pictures	 *Principal structure and the scheme of soil profile sampling* 

GOOD PRACTICE DESCRIPTION FORM		
Title	Wine Routes as Promotional Tools for Viticulture	B.S.24
Short description of the practice	According to the definition given by the Centre National des Resources du Turisme en Espace Rural (France), the "wine route" is a sign-posted itinerary, through a limited area (region, province, denomination area) whose aim is the discovery of the wine(s) product(s) in the region and the activities which are associated with it. This discovery is carried out directly on the farms (enabling the traveler to meet the producer) and/or in the spaces specifically organized around the wine produced (wine tasting centers or wine museums). The itinerary involves a number of stages consisting of: • Visits to a wine farm with or without a wine tasting session; • The discovery of the vineyard; • A visit to a museum or wine tasting center; • The chance to purchase wines; • A "refreshment" stage, enabling the visitor to try the culinary specialties of the region, and • Accommodation. The wine route is a kind of cultural itinerary that plays its part in the overall tourism strategy of a region. Like any other cultural itinerary, it must correspond to a real or imaginary path, able to reveal, through a specific heritage, the elements which make up the identity of a geographical area. It is also the way for the visitors to discover other things which a region has to offer.	
Aim of the best practices	The wine routes act as an instrument for the development of production in rural areas. In the context of the development of the rural areas, it has seemed useful to the valorization of typical wines and their areas, a practice that has been spreading in recent times in the countries of southern Europe but which is already well-established in the wine-producing areas of northern Europe.	
Suggestions for implementation	It is important to create a network of itineraries that intersect with others and complement each other so that the visitor does not have a chance to get tired of a too full and single-themed itinerary. A tourist itinerary is almost invariably accompanied by a brochure with a map showing the route traveled and its various stages. This is a particularly important factor as it is frequently what initially motivates the tourist. The wine routes can either be worked out by public bodies which are involved in tourism or by trade groupings such as producer unions, professional associations, or other associations.	

Expected Results	• Benefiting local authorities, businesses, communities • Raising awareness of wine history and products • Promoting a strong local tourism product • Developing sustainable tourism practices • Increasing the capacity of local businesses • Promoting wine tourism along with cultural tourism
Improvable or Critical Aspects	The wine routes are by their very nature particularly suited to being pioneer instruments for rural development. They involve sectors that are in difficulty and require conversions, such as the wine-producing sector and agriculture, linking them effectively with sectors in notable growth, i.e., those of rural tourism and thematic tourism. The most important repercussions are renewed interest in the management of the countryside and the important potential for the creation of jobs and new professions. In this context, the farm itself is of essential importance. The success stories in Europe have been created around a nucleus of dynamic and innovative farms which are prepared to invest money and human capital into the initiative. From the numerous lessons learned from the wine routes and from rural tourism in general, it emerges ever more clearly that the incentives must support a productive reality that is capable of managing very large efforts. One French magazine [1] sought to identify the requirements for the management to welcome tourists to the wine-producing farm on a wine route: • Excellent knowledge of wine, the region, the land there, the species of vine, and of wine tasting skills • A good attitude towards groups, being pleasant and easy-going, and being able to speak in public • The ability to speak English with knowledge of the technical vocabulary of this sector • The ability to advise people in their wine purchases • The ability to invest for the mid-term before making any gains. Along with these factors is the need for the farm to be able to provide suitable rooms for the reception of groups, a wine tasting service, and a guarantee of a high standard of conservation and maintenance of the winery.

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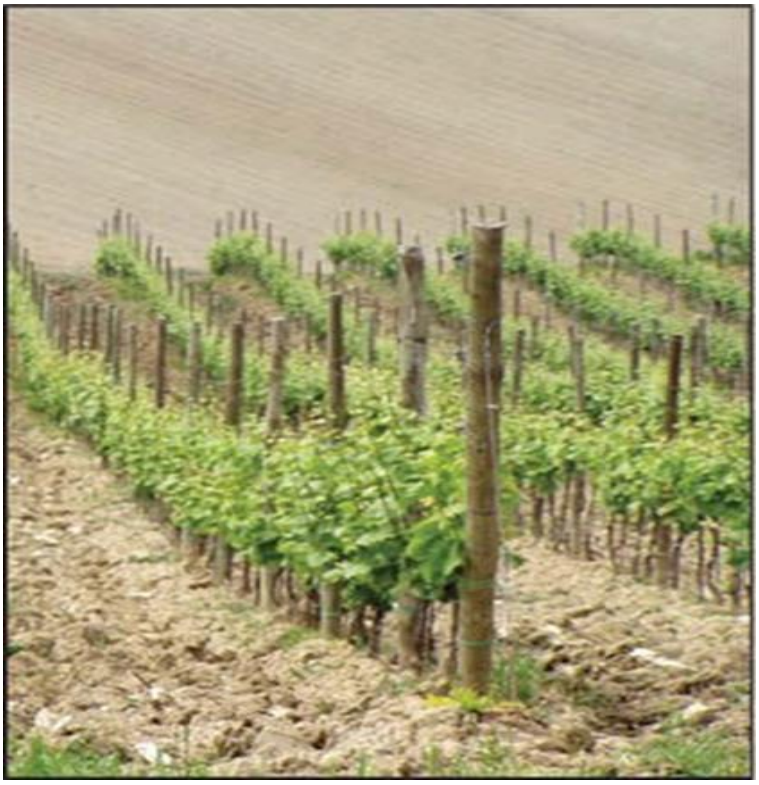
References	Strada del vino e dei sapori, PAT
Pictures	

GOOD PRACTICE DESCRIPTION FORM		
Title	Wood Poles	B.S.25
Short description of the practice	Up to thirty years ago, wooden poles were the most widespread vine brace. They are mainly used for their reduced environmental impact and for their flexibility combined with their ability to mechanize the harvest and pruning with special machines. The offer of wooden poles on the market is qualitatively heterogeneous, as it depends not only on the wood essences used for their production - among which are Scots pine, maritime pine, larch, white fir, spruce, chestnut, and black locust - but also by the characteristics of the growth environment - continental or Mediterranean - which affects its speed of development. The characteristics of the pile, particularly its duration, are also affected by the seasoning period and the treatment with which it is impregnated with salts, which can take place by means of a simple bath or in an autoclave at high pressure. They can be supplied with or without a tip in the turned, planed, and debarked types; the latter, due to the fact that the wood fibers are intact along the entire length, tend to have greater resistance and elasticity. Laminated wood poles have also recently appeared on the market, equipped with a polyurethane coating to protect the portion that is driven into the ground. The peculiarity of the wooden poles is high flexibility, good impact resistance, and low weight, which allows for easy handling. They are also respectful of the beaters of the grape harvesters, resulting in reduced wear. The validity of these types of poles under the aesthetic profile is very important, which allows for a reduction in the visual impact of the system since they are made of a natural material. The most used are the following types of wooden poles: • Pine poles • Chestnut poles	
Aim of the best practices	The use of wooden poles is excellent for use in vineyards for reasons of environmental friendliness and for the natural aesthetic aspect, which gives harmony with the surrounding landscape. It guarantees long life and does not present problems for disposal at the end of its use in the vineyard.	

Suggestion for implementation	For the creation of a vineyard, the ideal is to use chestnut or pine poles as a guardian for the vine; the chestnut or pine pole has always been known and used in this sector for a number of very specific reasons. The chestnut pole has an excellent hold in the ground due to the tannin present in this type of wood. It is preferable that the wood has been cut in the "January old moon," with the barking of the pole, burning of the tip, and angular cutting of the head to facilitate the drainage of rainwater. The overall durability depends on many factors, but a quality chestnut pole can well last up to thirty years. The elasticity and strength of the chestnut poles are also important, making them particularly suitable for use in vineyards where mechanized pruning and harvesting are practiced. They are very resistant to wind hits.
Limitation or Adaptability	Their duration, compared to the life of the vineyard, is reduced. The limit of wooden poles is, in some cases, represented by perishability, which can be accelerated in soils that are constantly humid, while it is not usually a problem in drained and generally dry soils. In order to ensure greater resistance against moisture, there are types of poles equipped with a metal tip that avoids contact between the ground and wood. Their cost is similar to steel poles.
Bibliographic indications	http://www.amblegnami.it/ http://www.ilvitigno.it/index.php/scheda-prodotti/items/pali-in-legno-per- vigneti-e-frutteti.html Impianto: scegliere pali, fili e accessori. Vigne, vini e qualità. Gennaio 2013
	PINE POLES TREATED **SHARNED AND POINTED** DESCRIPTION Autoclaved with quaternary copper Raw pine pole PROVIDING Ø 4/6 l=1.5-2.00 M Ø 6/8 l=2-2.20-2.50-2.75-3.00m Ø 8/10 l=2-2.20-2.50-2.75-3.00m Ø 10/12 l=2-2.20-2.50-2.75-3.00m **Ø 12/14 l=2-2.50-2.75-3.00m** 

CHESTNUT WOOD POLE DESCRIPTION Nature chestnut wood pole PROVIDING Ø 8/10l= 2.50-2.75-2.80-3.00 m Ø10/12 l= 2.75-2.80-3.00 m Ø 12/14 l= 2.50-2.75-2.80-3.00 m	
TURNED WOODEN POLE DESCRIPTION Turned wooden pole PROVIDING Ø 8 l = 1.50-1.75-2.00-2.50-3.00m Ø 10 l =1.50-2.00-3.00m Ø 12 l = 2.50-3.00m Ø 12 l = 1.50-2.00m con foro e sella Ø 12 l = 1.75 con 2 fori	



GOOD PRACTICE DESCRIPTION FORM		
Title	Strategy for Communication Agroecological Products	B.S. 26
Short description of the practice	Agroecological products are not certified as organic or integrated agriculture or with other certifications; for this reason, it is really important to find a market channel where they can be placed and sold with the proper value. Too often, open markets are promoted without considering local economies, farmers' well-being, and the prices farmers receive for their products, without accounting for the efforts made while practicing agroecology to protect the environment. Valuing agroecology is, in this respect, beyond the aspects of economy or money. Agroecology has the potential to ensure access to diverse and nutritious diets for people at all income levels. There is growing evidence that agroecology, implying diversified farming systems, facilitates diverse diets among producers, households, and consumers through increased consumption of a range of important nutritional elements that are often lacking in diets based on staple cereal crops. A significant health benefit of a diversified agroecological system is that it reduces exposure to pesticides and other harmful chemicals used in agriculture.	
Aim of the best practices	People want to eat well and ethically; they pay attention not only to the quality of the finished product but also to the production chain. Here the consumption of sustainable agri-food products such as organic ones is spreading like wildfire. The aim of this practice is to introduce agroecological products on the market that are desirable and reflect the characteristics of the product, the territory, and those who cultivate it. These concepts must reach the consumer in a clear and direct way, respecting the transparency between the product obtained in the field and the sale price, which must be a price that considers the sacrifice and the suffering that has been made to obtain it, together with the price of the territory that is the landscape that surrounds and characterizes the agroecological product. It is important to underline the added value that the landscape and the rural environment represent on the product.	
Suggestion for implementation	It is important that small-scale models are disseminated and scaled up to all, especially those living in marginal areas. The broad diversity of consumers, including their expectations, should be considered, and more research could focus on reaching consumers who are not already driven by concern for the environment. Among the actions where governments could encourage agroecology, public procurement was seen as being one of the most important opportunities. It is considered important that governments reinvest in agriculture through public procurement programs for agroecological producers by adapting procurement protocols to the local realities of agroecological production. Governments have an important role in creating innovative market models and have a key role in building local economies and markets as they govern food chains. The support of innovations with, for instance, the creation of food councils at local, regional, and national levels was mentioned as well as the need for subsidies for local markets. Governments could focus on regulating the market, thereby ensuring fair prices for farmers.	

Expected Results	• Extend the dialogue between health, nutrition, ecology, trade, and agriculture actors to support the development of agroecological sustainable, and healthy food systems • Build several agroecology alliances, for example, an alliance between agroecology and gastronomy, how to valorize products to add value to support farmers' income and ecosystems, an alliance between agroecology and decision-makers (put food producers at the center) • Develop public and long-term financial measures, training knowledge exchanges to improve short supply chains that favor small-scale producers, such as direct marketing and value-adding, peasant markets, and micro dairies
Improvable or Critical Aspects	Pavol Georgiadis (Co-Founder of "We Deliver Taste" and grower at Calipso Greece) noted that the world is experiencing a new public awareness, and there are excellent opportunities for developing market solutions, products, and services investing in food knowledge. With the sharing economy and technologies catalyzing this transition, a whole new scenario is emerging for the food economy, closing the circle. A new form of ethics is forming in the market based on transparency, awareness, empowerment, and participation. A practical example that can be adopted to implement this concept is "brand labels." These labels link products directly to producer groups and create a market identity for them. There is evidence for this in data, with consistent references to brand names as a clear quality indicator. An agroecological label should become synonymous with high-quality products. For this reason, it should be a good practice to sell the agroecological products obtained by this project with a specific brand that all PPs can affix on the label products that identify agroecological concepts of ECOVINEGOALS. This brand will be accompanied by a handbook or a booklet that explains the reason for the brand and the way this product was produced.

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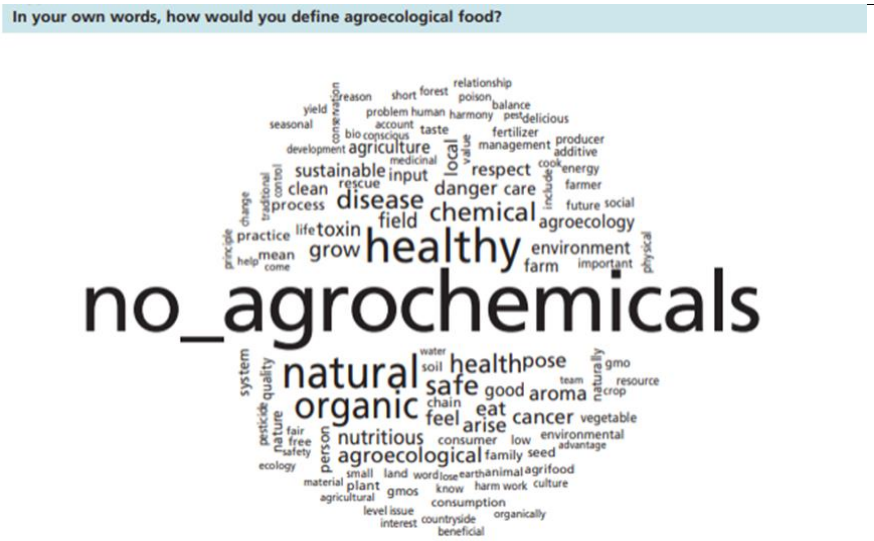
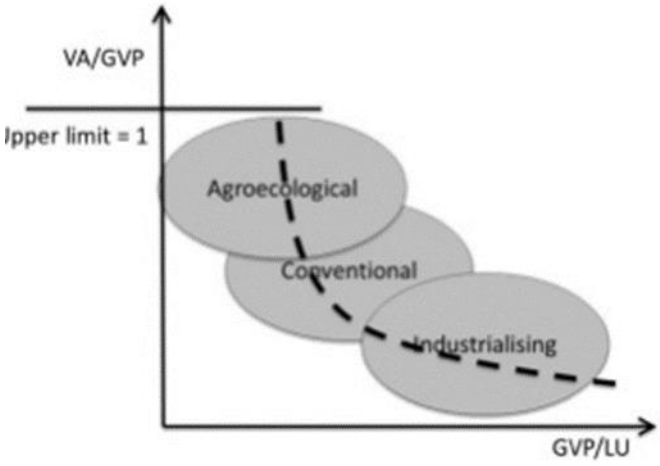
Pictures	  

GOOD PRACTICE DESCRIPTION FORM		
Title	Erosion Prevention	B.S. 27
Short description of the practice	Surface runoff and resulting soil erosion are the principal means by which fertilizers, sediment, and pesticide residues reach surface waters. Infiltration of 'ponded' runoff through permeable soils can move nitrogen and pesticide residues into groundwater. Controlling water flow through and out of your vineyard will greatly reduce the transport of contaminants off-site and will preserve your vineyard's productivity. Three proven methods of reducing runoff and erosion are to: 1. Divert excess water around your vineyard, 2. Slow runoff out of your vineyard, and 3. Provide ground covers that break the force of raindrops before they reach the soil. Soil erosion involves the movement of soil particles from one area to another. In arid areas, disturbed soil is often moved by wind. In areas with more rainfall, however, water movement is the prime force behind soil erosion. Soil engineers recognize two types of soil erosion: • **Gully erosion** involves the mass movement of soil from an area of concentrated flow, often following heavy rainfall. Gullies expand rapidly and are highly visible. • **Sheet and rill erosion**, as the name implies, involves a more subtle loss of soil across an entire area. It is more constant but harder to spot since it involves the movement of an imperceptibly small layer of soil. Runoff and soil erosion impact surface water quality directly through the deposition of sediments in waterways, streams, lakes, and estuaries. It is also the principal means by which fertilizers and pesticides (particularly herbicides) applied to a vineyard move offsite, as they are often attached to soil particles. Soil erosion also limits the productivity of vineyards. This soil movement complicates vineyard management and leads to more variability in vine size and performance. In flatter areas with permeable soils, runoff accumulates in low areas of vineyards, where it can slowly infiltrate into groundwater. For these reasons, soil conservation practices that control water movement both into and out of vineyards, and limit the force of rainfall hitting the soil, are the best means for maintaining sustainable production and avoiding off-site movement of pesticides and fertilizers.	

	Factors Influencing Rates of Erosion Topography, soil characteristics, rainfall, and ground cover determine the annual rate of soil erosion. Soil conservation professionals use a tool called the Revised Universal Soil Loss Equation (RUSLE) to estimate annual rates of soil erosion on a particular site. This equation predicts an annual rate of soil loss (A) based on several factors that influence erosion. These factors are: • **Rainfall.** The amount and intensity of rainfall in a given climate influence the amount of runoff and leaching. • **Soil type:** Soils differ in their 'erosivity' or 'erodibility' based on composition, soil particle sizes, and reaction to freeze/thaw cycles. • **Slope length:** The longer a slope, the more area it drains and the more water it carries. • **Slope steepness:** Water runs faster and with more force down steeper slopes than down shallow slopes. • **Crop factor:** The type and sequence of crops grown affect erosion. For example, continuous corn would be more prone to soil loss than corn planted in rotation with alfalfa and small grains. Perennial crops like grapes with less frequent tillage and soil disturbance would have a lower crop factor than annually seeded crops. • **Management factor:** This factor is used to account for different management practices. For example, 'no-till' corn, where crop residues are left on the surface, would reduce erosion compared with corn grown with clean tillage. Similarly, a vineyard with row middles disked four times annually would be more prone to erosion than one with the permanent cover or straw mulch in row middles. Soil conservation professionals use RUSLE as a planning tool to determine how different management practices or structures would affect the annual soil loss. For example, installing diversions or terraces would reduce erosion by reducing the effective slope length. The general goal is to reduce the annual estimated soil erosion to less than the annual replacement or soil formation rate, generally between 3 and 5 tons per acre per year. If that sounds like a lot, consider that an acre-foot of soil weighs about 2 million pounds and that 5 T/acre/year would amount to a layer about 0.03 inches thick.
Aim of the best practices	Soil conservation practices prevent erosion and maintain clean water in three ways. First, the diversion of water around vineyards keeps water clean because it doesn't wash over disturbed soil in the first place. Filtering of water through soil (drainage systems) and ground covers removes soil particles and other material suspended in water that passes through vineyards. Finally, ground covers provide a protective barrier that breaks the force of raindrops that could otherwise dislodge soil particles.

Suggestion for implementation	**Diversion Ditches:** Diversion ditches are soil structures constructed at intervals across the slope. They collect water from slopes and divert it into natural drainage ways. They are seeded and gently graded and slow the water down to reduce its erosive force. They can reduce the amount of water running through a vineyard by as much as 80%.
	Water and Sediment Control Basins: Raising a berm across a gully with a subsurface outlet pipe that discharges at the base of the slope will collect runoff, and this will stop erosion by slowing down water and collecting the sediment.
	Buffer Strips: All vineyards require headlands and grassed areas around their perimeters to allow machinery to turn around. These grassed areas also protect natural drainageways by filtering surface water that leaves vineyards before it gets to streams, drainage ways, and depressions. Generally, about 40 feet of headland around vineyards is adequate for a buffer strip.
	Drainage Tile: Subsurface drainage tile, commonly used in vineyards with moderate to heavy-textured soils, also helps protect water quality in two ways. Drainage tile reduces surface runoff that would otherwise occur when soils become saturated with water. It also allows water to be filtered through the soil, which removes many contaminants that would be present in surface runoff.

	Vineyard Layout: Planting vineyards so that the rows run across the slope rather than up and down the slope can reduce erosion by up to 50%. In New York's Finger Lakes Region, east and west-facing slopes predominate, so planting across the slope allows vineyard rows to be oriented north and south, which allows for maximum sunlight interception as well as soil conservation. In other areas, slope direction varies; all other things being equal, vineyards should be planted across slopes (even if doing so results in east-west rows rather than north-south row orientation) to control erosion. Steep slopes (>15 to 20% slope) may need to be planted up and down hills to allow safe use of machinery, but such sites will be prone to more erosion as well. Vineyards may be especially vulnerable to soil erosion during establishment. Many non-bearing vineyards are maintained with clean tillage to help vines get off to a strong start without undue competition from weeds. Small vines don't develop much of a canopy to intercept rainfall before it reaches bare soils. The best time to consider and install soil conservation structures is while you are planning and designing the layout of the vineyard. ***So, consider these steps when establishing a vineyard:*** • Consult a soil conservation professional or engineer early in the planning stages. • Discuss areas of concern, water flow patterns, and potential solutions to water management issues, and develop a plan with him or her to deal with specific situations. • Consider the use of temporary measures such as straw bales or 'silt fences' in concentrated flow areas to interrupt water flow. • Leave plenty of room for grassed filter strips around headlands and grassed waterways in concentrated flow areas. • Design your vineyard with row breaks around swales, where possible. Low areas are often frost pockets. Maintaining them in sod will help filter runoff and reduce erosion. • Seed a cover crop in row middles by late summer to protect against winter runoff and erosion.

Expected Results	• Increase in the environmental sustainability of hill and mountain agroecosystems of high landscape value, in reference to the reduction of the risk of soil erosion, which passes through the experimentation and use of agricultural practices, technologies, techniques, and innovative production processes; • Reduction of the impact on the territory through the imposition of innovative technical means of processing, which allows a lower load on the ground; introduction of conservative techniques (sustainable and low cost) of soil anti-erosion structures (e.g., dry stone walls); • Continuous monitoring of the erosive capacity of innovative technical conditions of use, aimed at refining the practices introduced by the project to reduce the risks of soil erosion; • Sensitization of the wine operators towards the assumption of a sustainable, productive approach, capable of mitigating the risk of erosion and improving soil management, in order to guarantee greater resilience of the same, which also passes through the perception of the "values" of biodiversity, understood in the ecosystem, economic and social terms.

Mulch applied in row middles reduces erosion and conserves water.

Photo by Tim Martinson, Cornell University.

Mulch: Straw mulch is commonly applied in row middles, especially in eroded sites with less vigorous vines. Although expensive to apply, it has many beneficial effects — it conserves soil moisture, increases the availability of soil nutrients, provides a barrier to reduce the force of rain drops, and can directly increase yield by up to 20% on some sites. Fall planting of annual rye seeded with a no-till seeder.

Photo by Tim Martinson, Cornell University.

Fall-seeded annual ryegrass is mowed in the springtime; decomposing residues suppress weed seed germination.

Photo by Tim Martinson, Cornell University.

Seeded cover crops: No-till seeding of row middles is another practice used by some growers. Typically, growers seed cereal rye in the fall, which germinates before winter. It then resumes growth in early spring and is later mowed or killed with a contact herbicide. The decomposing straw left behind also has chemical substances that prevent new weeds from germinating and extends the 'weed-free' time.

Reduction of tillage, while reducing soil erosion, also has the added benefit of allowing more timely operation of equipment after rainfall and reducing soil compaction from machinery. In dry years, contact herbicides applied to row middles conserve water.

Photo by Tim Martinson, Cornell University.

Using cover crops and mulches to protect the soil surface has an enormous effect on annual rates of erosion. Mulches reduce the force of rainfall hitting the soil by 98%, according to Jim Balyczek, Soil Conservation District Manager, Yates County, New York. Use of permanent cover crops in row middles on a 10% slope with a 200 feet slope length reduced potential annual erosion from 5.1 T/acre under 'clean tillage' to 0.39 T/acre, in an example provided by Tibor Horvath, NYS Conservation Agronomist, USDA Natural Resources Conservation Service, New York.

The appropriate cover crop plants to seed will vary by region. Contact your local extension

representative for recommendations on cover crop plants that may be suitable for your area or region.	
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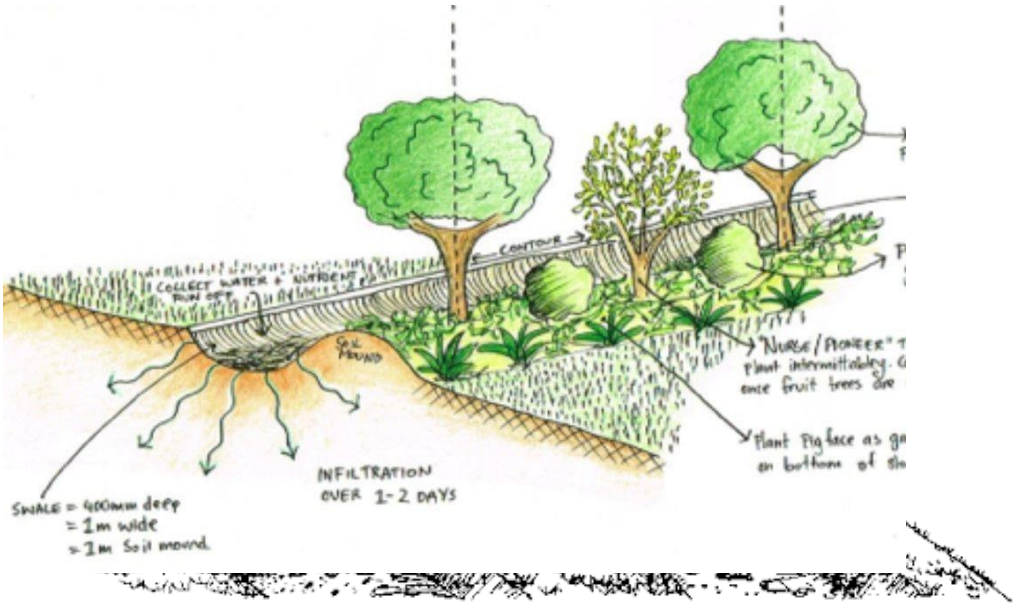
References	Provincia autonoma di trento (PAT)
Pictures	Examples of contour diversion ditch and check dams for use in gully control 

GOOD PRACTICE DESCRIPTION FORM		
Title	Composting or Mulching of Grape Vine Winter Pruning Residues	B.S. 28
Short description of the practice	Every year during the winter pruning of the vineyards, large amounts of wood biomass (Pari et al., 2018) are removed and are traditionally burnt (Longbottom and Petrie, 2015), resulting in CO2 emissions. Instead of burning this valuable agricultural residue, farmers can choose to do one of two things. They can perform in-situ mulching by spreading the pruning biomass in the corridors inside the vineyard and then passing over with a tractor and appropriate shredder implement so that the canes are broken into small pieces and are integrated with the soil. More optimally, grapevine pruning biomass can be chopped in a shredder and composted on or off-site, alone or in combination with other agricultural residues available in each area (e.g., grape stalks, manure, winemaking residues, and olive oil mill residues, etc.) (Manios, 2004). The resulting compost can then be reused as organic fertilizer in the vineyards. This practice effectively prevents the emission of Greenhouse Gases from the combustion of wood biomass and, at the same time, contributes to the soil fertility in the vineyard by adding essential nutrients and organic matter.	
Aim of the best practices	To prevent the emission of Greenhouse gases produced by the burning of vine pruning biomass and to produce a high-quality organic compost that is returned to the vineyard.	
Suggestion for implementation	During the late winter/early spring period, when winter grape vine pruning is applied in vineyards, farmers can collect all the wood biomass and either a) spread them in the corridors between the vineyard lines and then pass with the tractor and shredder so that the canes are broken into small pieces and are integrated with the soil to contribute to the Total Organic Carbon content of the soil in the vineyard (Morlat and Chaussod, 2008), or, b) use a wood chipping machine/shredder to reduce the pruning of wood biomass into chips of small size so that the composting process can proceed more rapidly. Appropriately sized shredding machines can be bought or rented for the period needed, by the farmer or by farmer cooperatives, according to their needs. PTO tractor-operated shredding machines are recommended for vineyards larger than 1ha, while smaller and lighter machines are suggested for smaller vineyards. The actual composting process can be completed in the vineyard or at a different location. A simple wooden box that can keep the composting materials off the ground and where mixing can be easily done is sufficient. It is highly recommended that the chipped wood from the grape pruning is mixed with optimal quantities of other agri-food residues and by-products available in the area. It has been shown that mixed composting can result in higher quality organic compost. The composting process should be completed after six months (Manios, 2004).	

Expected Results	It is expected that farmers will stop burning the grape vine winter pruning biomass and adopt one of the two suggested management practices.
Improvable or Critical Aspects	Farmers should be very careful about fungal diseases of the wood trunk. If the vineyard is known to be infected with fungal pathogens that cause vineyard diebacks, such as Esca complex or Eutypa lata, then the wood from these plants should be taken out of the vineyard to be composted in a different location, and the resulting compost should be used for non-vine cultivation. The Carbon to Nitrogen (C: N) ratio of the compost mix is critical for the successful completion of the composting process. The farmers should make an effort to add an appropriate amount of agri-food residues that contain high levels of Nitrogen to the vineyard biomass (Wang and Schuchardt, 2010).
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References	Longbottom, M. L., and Petrie, P. R. (2015) 'Role of vineyard practices in generating and mitigating greenhouse gas emissions: Greenhouse gas emissions in vineyards,' Australian Journal of Grape and Wine Research, 21, pp. 522–536. DOI: 10.1111/ ajgw.12197. Manios, T. (2004) 'The composting potential of different organic solid wastes: experience from the island of Crete,' Environment International, 29(8), pp. 1079–1089. DOI: 10.1016/S0160-4120(03)00119-3. Morlat, R. and Chaussod, R. (2008) 'Long-term Additions of Organic Amendments in a Loire Valley Vineyard. I. Effects on Properties of a Calcareous Sandy Soil', American Journal of Enology and Viticulture, 59, pp. 353–363. Pari, L. et al. (2018) 'Pruning Biomass Potential in Italy Related to Crop Characteristics, Agricultural Practices and Agro-Climatic Conditions', Energies, 11(6), p. 1365. DOI: 10.3390/en11061365. Wang, Y. Q., and Schuchardt, F. (2010) 'Effect of C/N ratio on the composting of vineyard pruning residues,' Landbauforsch. vTI Agric. For. Res, 60, pp. 131–138.

Pictures	 *Image 1. Vineyard prunnings in the corridors between lines.* *Source: https://www.evineyardapp.com/blog/wp-content/uploads/2018/02/rozge.jpg*  *Image 2. Flail mulcher tractor implement to break prunings in corridors.* *Source:https://static.seppi.com/images/trinciatrici_mulcher_broyer_shredder/1_trincia_bassa_me- dia_alta_potenza/4_smwa_slim/SMWA_slim01.jpg*

Image 3. PTO-driven tractor implement shredder making wood chips.
Source: https://tomcatchippers.co.za/options-trailerized-pto-driven-chippers/

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Image 4. Compost application in a vineyard.
Source: https://anlscape.com.au/compost-spreading-farms

GOOD PRACTICE DESCRIPTION FORM		
Title	The Use of Wood Chips (BRF - Bois Rameal Fragmentè)	B.S.29
Short description of the practice	It is a technique that involves the use of pieces of wood obtained from the shredding of wood residues (mainly broad-leaved trees). It starts with sprigs of oak, hornbeam, locust, etc., with a maximum diameter of 5-7cm. The material can be placed in heaps for the preparation of compost or a pre-compost (mass composting), or it can be distributed as it is on the ground (surface composting).	
Aim of the best practices	The use of the BRF aims to reintroduce good quality of lignin into the soil in order to form stable humus.	
Suggestion for implementation	The twigs to be shredded must not exceed a thickness of 7cm and must come from hardwood essences of broad-leaved woods, defined as "Climax," taken during the winter without leaves. The chemical analysis of this material revealed an unexpected richness of proteins, enzymes, and carbohydrates, and the lignin is slightly polymerized compared to that of the logs. Conifers should not be used; up to 20% presence can be tolerated. The quantities to be applied to the soil can vary from 1.5cm to 2cm thick (150- 200m3 / ha) in the first application, and the effect lasts 4-5 years. Then the treatment can be repeated by spreading 75m3 / ha every three years. Spreading must be carried out in autumn-winter, both for the availability of material and to favor the settlement of fungi over bacteria. Nitrogen-blocking problems were actually found, especially in the first year of spreading. The combinations of BFR with the cultivation of legumes and with the use of organic fertilizers of animal origin have proved to be interesting and effective. It is noted that the latter technique has the advantage of sequestering excess nitrogen reliquates at risk of leaching or stimulating a nitrogen-fixing crop.	
Expected Results	There were clear improvements in the structuring of the soil (stable aggregates, porosity, etc.), in the management of nitrogen (less presence of relics, improvement in the protein content of products), phosphorus, and water (less need for irrigation).	
Improvable or Critical Aspects	A critical aspect may be the need to plan a BRF supply chain with possible regulatory corrections. In the meantime, you can start with the material derived in your company from pruning and thinning of rural hedges or portions of the forest.	
Bibliographic indications	Parolin L. - Il BRF (Bois Rameal Fragmenté) nella ricerca scientifica (2010) HTTPS://FR.WIKIPEDIA.ORG/WIKI/BOIS_RAM%C3%A9AL_FRAGMENT%C3%A9	

References	Autonomous Province of Trento
Pictures	Dry wood chips   Spreading with a manure spreader in a direction perpendicular to the rows of culture.