



Procedia Environmental Science, Engineering and Management 7 (2020) (2) 185-193

24th International Trade Fair of Material & Energy Recovery and Sustainable Development,
ECOMONDO, 3th-6th November, 2020, Rimini, Italy

ENVIRONMENTAL MANAGEMENT STRATEGIES IN SMART SICILIAN FOOD AND TECHNOLOGY CHAINS*

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Abstract

The main aim of the wine roads is the promotion of the territory through the “from the field to the fork” and zero kilometre strategies, passing by healthy and nutritious foods produced paying attention to the environmental protection. The wine roads promote a revitalization of the regional institute of Vine and Wine that is the guarantor of a greater and greater notoriety for Sicilian wine products. The case study examines the Etna Wine Road Association by administering a questionnaire to the participating companies in order to evaluate their environmental sensitivity. The knowledge of the current situation is crucial for improving the process and guaranteeing a long-term solidity that is possible through the acquisition of binding certifications of the agri-food sector oriented to the sustainable development. This way there could be an increase in the touristic flow, a reduction in environmental impacts, efficient waste management and a valorisation of the Etnean territory.

Keywords: enogastronomy, sustainable strategies, viticulture, valorisation of local resources, wine tourism

1. Introduction

Nowadays the demand of Sicilian wine is significantly changed because it concerns not only the satisfaction of a need, but it is representative of a status. The new wine-making process aim concerns a more and more quality-oriented production, that is expression not only of the organoleptic characteristics of the product, but also of some intangible aspects,

* Selection and peer-review under responsibility of the ECOMONDO

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such as its links with history, culture and landscape of origin. In order to meet this need, the European Union has introduced three certification schemes that guarantee and test the products authenticity by assigning to them a specific logo to be attached to the foods complying with the required standards. Following this classification, wines are classified as PGI (Protected Geographical Indication) and PDO (Protected Designation of Origin).

The Italian legislation introduced some variants with Law 164 (1992), that identifies the IGT (Indicazione Geografica Tipica), the DOC (Denominazione di Origine Controllata) and the DOCG (Denominazione di Origine Controllata e Garantita). The DOC classification is referred to that areas, traditionally suited in giving high quality wines that, before obtaining this accreditation, have maintained the IGT classification at least for five years. In this case, the bound with territory is very relevant.

The adoption of quality labels gives several advantages. First of all, they enable consumers to perceive the quality of the offered products; secondly, the producers are more triggered in providing high-quality products; thirdly, thanks to the certifications, the territorial production is promoted and valorised.

Nowadays, in Sicily there are 22 wines with a controlled origin's designation, one with a controlled and guaranteed designation of origin and 7 with a typical geographical indication. Sicily is the most vineyard area in Italy, with over 160.000 hectares, and it produces the highest wine quantity, on average of about 8.5 million HI per year. The province of Trapani is the most vineyard area in Italy: it boasts over 70,000 hectares of vineyards and it produces the highest amount of hectolitres of wine, about 4 million HI per year. The Sicilian production arises thanks to the excellent quality-price ratio. The price of wine is due to several factors, such as soil, vineyard, processing and cultivation risks, investments in wine cellars, winemaking techniques and promotion. While in the other Italian regions the price disparity between common and fine wines is particularly striking, in Sicily the situation is quite different. Here, the vineyards and cellars maintenance costs are much lower than average and this factor allows the producers to apply lower prices and consequently widens the consumers target. Thanks to the resourcefulness and farsightedness of Sicilian producers, a "Brand Sicilia" has been established, today known and appreciated everywhere.

The Italian legislation introduced some variants with Law 164 (1992) which identifies: TGI (Typical Geographical Indication); DOC (Denominazione di Origine Controllata); DOCG (Denomination of Controlled and Guaranteed Origin).

The continuous improvement of the Sicilian wine sector refers to a proactive vision of producers, who try to keep up with technological innovations interconnected with two fundamental pillars: sustainable development and the circular economy. In 1987, the definition of sustainable development was given by the World Commission on Environment and Development (UNO, 1987). Sustainable development incentives the current generation to meet their needs without compromising the ability of future generations to meet their own. The Global Agenda for Sustainable Development Goals (SDG) covers a number of objectives to be achieved by 2030. The document comprises 17 objectives. These goals are interconnected and indivisible and they aim to balance the three dimensions of sustainable development: economic growth, social inclusion and environmental protection (www.camera.it). Below are the 17 Sustainable Development Goals: 1. Overcoming poverty; 2. To overcome hunger; 3. Health and well-being; 4. Quality education; 5. Gender equality; 6. Water and sanitation facilities; 7. Clean and affordable energy; 8. Decent work and economic growth; 9. Enterprise, innovation and infrastructure; 10. Reducing inequalities; 11. Sustainable cities and communities 12. Responsible consumption and production; 13. Combating climate change; 14. Life under water; 15. Life on Earth; 16. Peace, justice and strong institutions; 17. Partnerships with objectives.

Referencing the concept of circular economy given by Stahel in 1982 with “The Product-Life Factor”, the extension of the product life span, i.e. its period of use, is a starting point for a gradual transition to a sustainable society and optimizes the resources used for the production of an asset, reduces the necessary natural resources and the waste, and consequently increases the well-being (Stahel, 1982). The circular economy is an economic model designed to feed itself: organic materials are reintroduced in nature and those of technical origin must be designed to provide the highest possible value before disposal. (Lacy, 2016). The concept of circular economy is a model based on the ability to reuse waste unlike the traditional and linear economic model, based on a “do-consume-throw away” model. The aim is to limit the loss of resources as much as possible (Ingrao et al., 2015). Basically, when a product reaches the end of its life, its materials are kept within the economy were possible. These can be used productively over and over again, thus creating added value. Measures leading to a circular economy include re-use, repair, restructuring and recycling of existing materials and products.

Nowadays, consumers are more aware of the need to base their choices on sustainable development models that are focused on protecting their environment. This also happens in the context of food and wine tourism. This concept is applied in the wine sector, where the valorisation of land and the use of pesticides in vineyards contribute significantly to the creation of environmental damage. The island is the ideal place for growing vines, thanks to the variety of soils and the warm and ventilated climate. The main character of the region is certainly Mount Etna. In 2007, Strada del Vino e dei Sapori dell’Etna was established in this area, with the aim of enhancing the territory and the Sicilian food and wine culture. The association has more than ninety member companies and this case study is addressed to them. The aim of the proposed questionnaire is to define the current situation regarding environmental sustainability of Strada del Vino e dei Sapori dell’Etna affiliates. These companies will be empowered about the present situation and enabled to apply those tools that would transmit notoriety to the association and allow it to reach a portion of the innovative market, made up of individuals sensitive to the issues of development and sustainable tourism. The results of the questionnaire revealed that the participant companies are adopting the appropriate strategies to increase the application of environmental sustainability in the managerial field (www.stradadelvinodelletna.it).

2. Case study: Association “La strada del vino dell’Etna”

The Sicilian territory has been crossed by many peoples: Phoenicians, Greeks, Romans, Bourbons, which have left an imprint and each of them has contributed to enrich this land, even in the wine sector. In the post-war period the wine-growing economy was in crisis and only in the Sixties of the Twentieth century the first regional policies were introduced, during the Seventies’ exports resumed and production considerably increased. As the years passed, in the cultivation sector increased the need to introduce innovations related to the vineyard management processes, new machines, irrigation and the controlled fermentation. In 1985, the Regional Institute of Vine and Wine became a provider of services in the wine sector and bottled wine (Bacarella, 2009). The presence of this institute ensures the valorisation of the Sicilian wine quality by equipping the vines with micro-winemaking facilities and consequently making possible to make an evaluation of the wine quality. In 1986, the IRVV ensures the participation of Sicilian wines at Vinitaly in Verona with the Sicilian Pavilion, where the wines of 24 Sicilian companies were presented.

The increased competitiveness in the markets implies a prior analysis of the context where the company operates in order to act in the best way and to preserve the competitiveness itself (Clasadonte et al., 2013a). Having knowledge of the market, the

sector, the target audience, its tastes and needs allows companies to analyse, through the collection of data about supply and demand, the trend of the market and predict its evolution. This factor allows to be able to offer the final consumer the product that best meets his needs. In order to address a proper market analysis it is necessary to distinguish two macro-areas of study, which are supply analysis and demand analysis. The extraordinary climatic conditions in Sicily allow the production of excellent grapes and the production of wines with unique and incomparable organoleptic characteristics that determine its excellence. Thanks to the proactivity of the investors the autochthonous vines, such as Nero d'Avola, Frappato di Vittoria, Nerello Mascalese, Inzolia, Catarratto, Grillo and others, are known all over the world and their unmistakable characteristics are appreciated. The wine produced in Sicily is packaged for 25% and the rest is marketed in bulk. The packaged production is destined to the foreign export for about 20%, the same percentage for the Sicilian consumption and for 60% to the other Italian regions. In percentage order, the main markets where Sicilian wine is exported are: the United States for 18.6%, Germany for 16.7%, Great Britain for 9.4%. The most drunk wines by Sicilians are Nero d'Avola, Syrah, Inzolia and Grillo. In 2017 there has been an export of 21,000 Hl of wine DOC Sicily certified. Analysing the subdivision of red and white wines, the latter find a good catchment area in Japan, for 9% of the total, against 4% for red wines, which have Belgium as their fourth destination. The two types realign in export to the Netherlands, fifth destination, and on France. Among the different wine roads present in the island, deserves special mention, for the territory which it extends in, the Association "La strada del Vino e dei Sapori dell'Etna": the peculiarity of the Etnean environments means that the vines present in these areas are cultivated exclusively in this territory. The association, located in Piedimonte Etneo, was founded on May 16, 2007, thanks to the then Chairman of the Board of Directors, Doctor Giuseppe Benanti. It is a non-profit association and pursues the affirmation of the historical, cultural, environmental, economic and social identity of the area of reference with the aim of spreading and enhancing the territory and the Sicilian food and wine culture. The territory of the association winds through several municipalities within the Etna Park. The virtual journey starts from the town of Riposto and then continues to Giarre, Mascali, Santa Venerina, Zafferana Etnea, Milo, Sant'Alfio, Piedimonte Etneo, Linguaglossa, Castiglione di Sicilia, Randazzo, Bronte, Adrano, Nicolosi, Pedara, Viagrande and Trecastagni. The wines produced by the wineries associated with Strada del Vino e dei Sapori dell'Etna have the following denominations of origin: DOC Etna, DOC Bianco Superiore, Sicilia IGT. According to the Statute, the companies associated with La Strada del Vino e dei Sapori dell'Etna can be grouped into five product sectors: wineries, accommodation, restaurants, services and typical products. The most important sector is that of wineries, within which are about 50% of members.

3. Materials and methods

The location of Mount Etna, characterized by two important factors such as altitude and exposure, ensures a thriving cultivation of vines. The viticulture of the Ethnic territory is different from the rest of Sicily. The harvest period of the Ethnic vines begins in October. The 65% crop is the tree-lined crop and the terraces on which the vines are located are mainly made of lava stone. Breeding is of two types: 27% of the total ethnic living territory; 3.3% of the volcano's surface. The quality of the wine produced varies depending on the side. In the east, wines produced are particularly rich in fixed acidity. The process that makes them acidic is called malolactic fermentation with which, after fermentation, you leave the wine on its own scum so as to favor their fermentation at the first warm of spring. In the south, viticulture is mainly for family use such as Nerello Mascalese, Carricante and

Grenache. On the north side is concentrated most of the production (37% of Etna wine), mainly red wine (Foti, 2001). It is important to highlight the contribution of wine tourism in the process of knowledge of cultures and crops of a particular area under consideration. In fact, wine tourism consists in associating the holiday visiting wineries and their vineyards, tasting the wines associated with local gastronomic products. This offers numerous advantages and opportunities, as it allows to raise the level not only cultural, but also economic and social of visitors. It is a modern kind of tourism aimed at discovering the gastronomic realities, studying the culture and enhancing the food of a particular territory.

In this new variant of tourism, wine plays a key role. Wine is considered a resource that helps to attract tourists in search of the places of origin of the products and interested in the typical products formed in a given place, which gives certain unique and irreproducible characters to the product. Among the most used tools with the aim of transforming the productive culture of the places and gastronomic traditions into tourist products are identified in addition to the denominations of origin, the streets of wine. The wine roads are first regulated in Italy in 1999, with the Law 27 July n.268. Article 1 defines these as “marked and advertised routes with special signs, along which insist on natural, cultural and environmental values, vineyards and wineries of individual farms or associations open to the public; they allow wine territories and their productions to be disseminated, marketed and used in the form of a tourist offer”.

The wine roads promote the local product, encouraging the creation of collaborations between the various economic actors and the establishment of relationships based on mutual trust. By focusing on the Sicilian wine roads, we can count over two hundred companies operating there. In order to learn more about the island area, numerous routes (www.eataly.net) have been established, trying to ensure greater economic, social and environmental sustainability, which is the foundation for intergenerational and intragenerational development. The focus on sustainability comes from the increasing sensitivity of consumers to the environment and for this reason they tend to value those companies that make the territory an added value. The questionnaire, proposed to the members of the Etna Wine Roads, aims to verify the current conditions of companies in terms of environmental sustainability. By administering this questionnaire, mandatory certifications relating to environmental management in the agri-food sector are carried out, such as: HACCP (Hazard Analysis Critical Control Point); The reference legislation is UNI 10854 (UNI 10854, 1999), which defines the criteria for identifying hazards and establishing measures to be implemented to prevent, reduce or eliminate them in order to ensure the sanitation of food products (Clasadonte et al., 2013b). Subsequently, it is required that Mandatory certifications for access to the GDO such as the BRC, Global Standards and the IFS (International Food Standard), documents that define the protocols to be respected in relation to process and product control, work and personnel management and resource optimization. The use of the company's voluntary green economy tools, such as: the LCA (Life Cycle Assessment) is then verified; Eco-design and sustainable design, which relate to the design of the environment based on environmental analysis and aimed at finding sustainable solutions with regard to saving energy and water resources, reducing pollution and the use of healthy and low-impact building and production materials and processes with low environmental impact; European Ecolabel, a label that distinguishes products and services that, while guaranteeing high performance standards, are characterized by a reduced environmental impact throughout the life cycle; There are also BAT (Best Available Techniques), APEA (Ecologically Equipped Productive Areas) and Industrial Symbiosis (Ingrao et al., 2015). In addition, the company to which the questionnaire is submitted is asked if energy efficiency is carried out in the company, whether renewable energy is produced and whether electric vehicles are used. Subsequently, the company must express

the percentage of the recycling and is asked to indicate how waste is eliminated or if they are sometimes re-entered into the production process.

This questionnaire how air impacts and impacts in wastewater are monitored.

Two questions relate to the “Green Economy”-themed conferences: the company is asked whether or not it participates and, if not, whether it would be interested in participating. Finally, in order for the company to take note of the critical points of its production process, it is necessary to analyze, with a view to sustainable development, the business process. The questionnaire was conducted on a sample of about 20 companies, as members of the Associazione La Strada del Vino e dei Sapori dell’Etna, two of whom preferred not to identify themselves. The companies under investigation are mainly located in the area of Randazzo which is located on the northern side of Mount Etna.

4. Results and discussion

It is important to note how the analyzed companies operate in different product sectors, which ensures a high degree of multifunctionality. Despite the heterogeneity, the cellars are 30% of the total. This questionnaire provides for the identification of the company by name, location and the product sector in which it operates. The questionnaire found 15 mixed-world questions: many of them were multiple-choice, while others were open-ended with limited to the expression of additional comments or percentages. According to the analysis, 78.9% of the companies surveyed adopt mandatory environmental management certifications for the company's agri-food sector, such as HACCP (45%). The analysis also shows an important adoption of ISO 9001 (ISO 9001, 2015) to create a system that can ensure customer satisfaction and continuous improvement of companies. The adoption of these regulations ensures a positive return in terms of the corporate image, necessitating a review of business processes. The ISO 22000 family (ISO 22000, 2018), Food Safety Management System Requirements, is a voluntary standard that aims to harmonize the different HACCP schemes. In fact, it defines certain requirements for the design and application of the HACCP system in every company in the agri-food supply chain (Clasadonte et al., 2013c). Since 2007, the European Union has made it mandatory to use the common organic brand for all packaged products, produced in the Community territory, which contain at least 95% of organic ingredients: the logo represents a leaf formed by twelve white stars on a green background, with a comet in the center. The control body's code and the actual origin, i.e. the place of agricultural production, must be indicated near the mark. In recent years there has been an increase in the attention to organic products by consumers who are increasingly incentivized to buy this type of food. The aim is to return to a more natural reality. Organic farming represents the future of agriculture because it supports production over time while preserving the stock of resources, the fertility of the soil (Zordan, 2019). It's from the desire to protect the environment that is undergoing a shift from the model of the “brown economy” based on the over-exploit of natural resources and little attention to environmental impacts, to the model of the “green economy” focused on the sustainable use of resources (Matarazzo and Baglio, 2018). However, analyzing the questionnaire data, 53% of respondents say that they do not adopt green economy tools, 85% of them says they are interested in adopting green economy tools. The most widely adopted instruments are the LCA (ISO 14040, 2006) (23.5%) and sustainable design (17.6%), 11.8% adopt Eco-design, APEA and Industrial Symbiosis and, finally, only 5.9% use tools such as European Ecolabel, BAT and organic agriculture. A particularly important fact in the questionnaire is verifying the implementation of the energy efficiency process with a set of actions aimed at maintaining optimal performance by reducing the exploitation of energy resources. According to the

analyzed data, in 66.7% of the companies surveyed there is energy efficiency and 73.7% of these produce renewable energy. Companies that initiate this process could install cogeneration plants that allow electricity and thermal power to be produced at the same time from a fuel source, or install photovoltaic systems. In order to increase the number of the companies that implements these tools, the Ministry of Economic Development grants incentives. Electrical vehicles are widely used within wineries in order to reduce the emission of harmful substances into the atmosphere and excessive energy consumption. The electric motor saves more than 50% of energy and this percentage is maximum if companies have adopted renewable sources. Another variable analysed in the questionnaire is definitely waste management. Under Legislative Decree 22 of 5 February 1997 (c.d. Decree Ronchi) it is defined as a refusal “any substance or object that falls into the categories listed in Annex A and which the holder has decided or has an obligation to dispose of” (Law 22, 1997). The Decree distributes powers between state, regions, provinces and municipalities in the area of integrated waste management, as the complex of activities carried out to optimise reuse, recycling, recovery and disposal of waste, which must take place in a coordinated way throughout the territory. In 72.2% of the companies surveyed, the extent to which recycling takes place is 100%. The implementation of a recycling process reduces the mass of virgin raw materials used in production processes, reduces the amount of waste in the disposal centres. According to the analysis conducted, only 10% of companies eliminate production waste as waste: 40% eliminate only a part of it, allocating the other part to be re-entered into the production process; 30% sell its production waste to other companies and 20% put them back totally into the production process. Analysing the responses of nineteen companies, 73.7% monitor air impacts; 68.4% have started an impact control in wastewater. Some implementation proposals are related to the implementation of the carbon footprint and the water footprint. These measure, respectively, the set of greenhouse gases that are emitted during the life cycle products and the impacts on the water resources generated by the product.

The carbon footprint (ISO 14067, 2018) (carbon footprint) is an indicator expressed in kg of global warming potential over a defined period, usually 100 years, and is expressed in equivalent KG2. The water footprint (ISO 14046, 2014) (water footprint) is an indicator of freshwater consumption that includes both direct and indirect use of water by a manufacturer (www.ccpb.it)

A final finding in the questionnaire is the propensity of companies to participate in Green Economy-themed conferences, half of the companies surveyed participate in green economy-themed conferences and 72% of them are interested in participating. Wine tourism takes on a very important weight in the process of knowledge of the cultures and cultures of a territory. It concerns a modern form of tourism aimed at discovering the gastronomic realities, the study of culture and the enhancement of the food of a particular territory. Tourists are increasingly looking for quality products and interested in gastronomic and culinary traditions to learn the local culture. In particular, wine is a resource for both the wine and touristic sectors, because the link it establishes with the territory is very intense: the place where the vine is bred contributes greatly to give unique and irreproducible characters to the product.

5. Concluding remarks

The Sicilian producers, who have focused on the quality of the wine sector, have created the so-called “Brand Sicilia”.

The main objective is to focus on the recognisability of the territory by enhancing its wealth and contributing to the promotion of wine tourism.

The key point of the wine roads is the cohesion between the various regional authorities. In fact who decides to become associated with the wine roads can take benefits by the presence of a network and the aggregation with other companies, greater opportunities for visibility both in the domestic and foreign markets and the promotion of the territory, typical products and food and wine tourism. The challenge posed to the associates of the “Associazione delle Strade del Vino e dei Sapori dell’Etna” concerns the integration of the principle of sustainability in the company's logic with the hope that a model of proactive environmental behaviour can be adopted. The results of the questionnaire show that the company's realities belonging to the “Associazione delle Strade del Vino dell’Etna” Association are still a long way from adopting a proactive management model. However, the sample showed a clear interest in the evolution of the way of doing business, stating that it is interested in adopting green economy tools and involved in conferences on the subject. The Sicilian wine supply chain is one of the most profitable companies on the island. However, nowadays an abandonment of the vineyards due to the generational change is feared. The new generations are marrying viticulture and wine tourism and in recent years there are an increasing number of lands planted with vines but which were previously uncultivated. The theme of wine tourism, as well as the theme of the green economy, are new themes to which the new generation, more informed and aware, can direct their company. The Sicilian Region is still far from adopting an environmental model that is completely sustainable, but adopting the necessary measures and tools, it could become the ideal destination for tourist flows that wish to combine fun and the optimal use of natural resources: this could be the starting point to face the adverse conditions in which the world economy is due to the spread of the Covid-19.

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