

Sustainable Viticulture and Organic Farming in Romania: Challenges and Opportunities for Future Development

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Abstract. *Sustainable agriculture is a concept based on different pillars that include the need to nurture healthy ecosystems and support the sustainable management of land, water and natural resources while ensuring profitability and social and economic equity. In order to achieve agricultural productivity in a sustainable way it is important to meet the environmental and climate challenges regarding food security, quality and sustainability.*

Nowadays, the global wine industry is facing profound changes that echo in the Romanian wine sector as well. In order to face these challenges, the Romanian wine sector must concentrate on its future to achieve sustainable development goals.

In addition, the Romanian Organic agriculture has great potential of development that serves both the domestic and foreign markets.

Starting from the new EU financial frameworks, Romania has the chance to develop the organic sector, based on the EU funding. Investing in organic farming is timely and strategic. The organic sector can prevent the loss of biodiversity; improve the ways of living of all actors in the food value chain, and help farmers move to more sustainable agro ecological practices. The ways of action for the sustainability of the sector should target the area of standards for competitive sustainability and the protection of human health in close connection with the one health concept.

The article focuses on the Romanian wine and organic agricultural sectors and the need to achieve a sustainable development in order to face future challenges.

Keywords: Sustainable development, Wine sector, Organic agriculture, Global challenges.

Introduction

Agriculture has the important task to provide food and resources to an increasing world population.

Nonetheless, the number of problems that agriculture has to face, including pollution, climate change, rising production costs, decrease of rural population, even pandemics, compromise its capacity to meet human needs in the present and future. The agricultural practices in the last decades caused most of the above; it has become clear that a change towards a sustainable future must take place as soon as possible. The concept of sustainable agriculture was catapulted to the forefront following the release of the Brundtland Report (1987).

The wine industry has definitively charted a course towards sustainability. The large number of academic literatures, academic journals and scientific communities, confirms it. A number of factors start to influence the industry towards a sustainable path: sustainable practices in wine making; proactive behavior of wine associations; institutions and regulators interest towards sustainability, consumer involvement in sustainability. Currently, Romania plays an important role in the European and world wine industry. According to the International

Organization of Vine and Wine, in 2022, Romania occupied the 10th place worldwide in terms of area under vine and the 12th place worldwide in terms of wine production. The Romanian wine sector received major investments, especially after the fall of communism and the accession in the E.U. Nonetheless, the road was not easy, and it took many efforts from both the investors and the public authorities to come so far. In order to create a sustainable path that could help the Romanian wine industry face global challenges as climate related issues, economic crises or even pandemics, a long-term common strategy should be designed, with participation of all the actors involved in the industry. Romania has the necessary resources and could become one of the most developed countries in terms of conversion to organic farming, mainly due to the large areas of agricultural land that have not yet gone through this process.

The growing interest of people in the consumption of organic products, but also the involvement of the European Commission on this subject in order to protect the environment on the one hand and to inform the population about the benefits on human health on the other hand, draws the future lines in the agricultural field.

Domestic and international trade will be able to focus on organic agricultural products in the coming years. For this, Romanian farmers must quickly adapt to future changes adopted at international level, in order to capitalize on Romania's potential and become competitive on both national and international markets.

Literature review

The idea of sustainable agriculture became popular in 1987 with the publication of the Brundtland Report, which tackled the issue of sustainable development in many fields especially in the agricultural sector. The Rio Declaration on Environment (1992) is the keystone to sustainable development. It comprises a set of 27 principles that advance concepts such as sustainable development and the centrality of human beings, the importance of the environment for future generations, the principle of common but differentiated responsibilities and two important economic principles: polluter pays and the precautionary approach.

Sustainable development is particularly important to agriculture and rural development. Sustainable Agriculture comprises “management procedures that work with natural processes to conserve all resources, minimize waste and environmental impact, prevent problems and promote agroecosystem resilience, self-regulation, evolution and sustained production for the nourishment and fulfilment of all.” MacRae et al. (1989), sustainable agriculture is a coordinated system of plant and animal production practices tailored to specific locations that will, over the long term: (a) satisfy human food and fiber needs; (b) enhance environmental quality; (c) make efficient use of non-renewable resources and on-farm resources and integrate appropriate natural biological cycles and controls; (d) maintain the economic sustainability of agricultural enterprises and improve the quality of life for both farmers and the broader community.” U.S. Farm Bill (1990) Sustainability can be seen as a concept based on various principles (Bruyn, SD., Drunen, MV., 2004) economic principles (maximizing welfare and improving efficiency), ecological principles (living within carrying capacities and conservation of resources) and equity-principles that concern intergenerational and intergenerational equity (the disparity of wealth among different regions of the world or among generations).

It is very difficult to find an all-encompassing definition of sustainable agriculture, a precise and exact definition is impossible. (Pretty, 1995).

Ohmart, (2008) shares an idea of how complex it is to be sustainable in agriculture: “sustainability involves everything you do on the farm, including economics, environmental impacts of everything done on the farm and all aspects of human resources, including not only you and your family but your employees and the surrounding community”.

An orientation towards sustainability in the wine sector has become extremely visible in recent years. The principle of sustainability opens a wide debate and affects companies in all their activities.

Some countries give more importance to sustainability than others. Ohmart, (2008) believes that a successful case of sustainable practice in winemaking is the Lodi region in California. The conclusion was that the success of the Lodi winemaking region is a combination of proactive behavior of associations, constant involvement of wine producers, workshops and effective communications flows.

Related to organic farming, at European level, recently, the European Commission made public the new Multiannual Financial Framework 2021-2024, which is called Next Generation EU. Through this document, the EU allocates € 750 billion for the organic sector and the advancement towards a more resilient and digital Europe include funding of 15 billion euros provided as assistance through the European Agricultural Fund for Rural Development. This aid aims to foster the development of rural areas, particularly in response to the pandemic challenges. Additionally, two significant documents from the European Commission related to organic farming include the Biodiversity Strategy and the Farm to Fork Strategy. (COM, 2020)

Both documents are aligned with the Green Deal and contain a plan of action and commitments to halt biodiversity loss in Europe and around the world and turn food systems into global standards for competitive sustainability, protection of human and planetary health (COM, 2019). It also covers the livelihoods of all operators in the food value chain. All these proposed actions at European level reinforce the idea that a sustainable functioning food system can reduce the vulnerability of Member States to disasters such as COVID 19.

Methodology

The article is trying to highlight the current state of the Romanian wine sector, in terms of production, area under vine and exports. Also, is also trying to examine the state of the Romanian Organic agriculture.

With the help of relevant literature regarding sustainability in the wine sector, the purpose is to determine the connection between quality wine and sustainable development. Following two major pillars of the Common Agricultural Policy of Europe: (1) Ensuring food security for 500 million people, (2) Protecting the environment by careful use of natural resources for food production and for ensuring quality of life today and in the future. Relevant literature, case studies of successful examples of the implementation of a long-term strategy focused on sustainability in the wine sector, show that there is a major connection between responsible consumption, food safety and economic growth of the industry.

In the organic farming sector, the demand for organic products has increased, especially in the foreign market; consumers are better informed about the effects of consumption of organic products on health. In order for Romanian operators to be able to sell and develop, they must meet requirements related to quality standards, certification, labelling, marking. Solving these problems is stringent and involves high financial costs to be able to access new markets inside or outside the E.U. (COM, 2019).

One direction for farmers and processors could be to align with E.U. sustainability requirements by identifying good solutions for optimizing practices and implementing quality systems. These solutions can contribute to the protection of the environment, climate, and air as indicators of sustainable development.

To ascertain a dependable definition of sustainable agriculture, an examination of both academic and practitioner-oriented literature was undertaken. We used quantitative research to collect data from the Romanian Ministry of Agriculture and Rural Development and the International Organization of Vine and Wine, to determine the actual state of the Romanian wine sector. Also, the case-study articles of successful wine growing regions that implemented sustainable development programs were helpful in order to draw conclusions on how a proper strategy can help an industry overall. Romania is by tradition a grape growing country and is widely recognized for its potential in producing wine. A result of the constant investments in vine-growing areas led to high productivity, according to the International Organization of Vine and Wine, in 2022 we have the following data: Romania is the 5th country in Europe in terms of hectares of vineyard planted, and the 10th in the world, in that respect.

Traditionally, Romania has held a notable position among Europe's wine producers, being the sixth-largest producer in Europe, and twelfth globally (OIV 2023). However, it has low visibility in the international export market, ranking 34th among global wine exporters and 37th among importers (World Trade Map 2022). In 2022, Romania exported wine worth \$37,382,000, with an annual growth rate of 2% from 2018 to 2022. The value of wine imports in 2022 was \$123,061,000, leading to a trade deficit of \$85,679,000 (World Trade Map 2022).

Data collected from the Romanian Ministry of Agriculture and Rural Development, show that from the total production of wine in 2020, which was, 3.957,7 thousand hl, only 2.382,03 thousand hl was noble wine, the rest of the production was made from hybrids interspecies. „Evaluation of the CAP measures applicable to the wine sector, Case Study: Romania” (Agrosynergie, 2018) was consulted in order to conclude a proper description of the wine sector in Romania. According to Agrosynergie (2018), impediments that delay a sustainable development of the Romanian wine industry are dysfunctional trade associations, lack of managerial and negotiating skills of producers, lack of consumers’ educations for consumption of quality wine.

The Romanian wine sector has been increasingly adopting eco-friendly viticultural techniques as part of its sustainability efforts. These practices aim to minimize environmental impact, promote biodiversity, and ensure the long-term health of vineyards. Some of the key eco-friendly techniques that Romania aims to implement according to data retrieved from the Romanian Ministry of Agriculture and Rural Development ”Guide to good agricultural practices regarding the effects generated by climate change” include: (1) Integrated Pest Management (IPM): This approach uses a combination of biological, cultural, physical, and chemical methods to manage pests and diseases with minimal impact on the environment, human health, and non-target organisms; (2) Organic viticulture: many Romanian vineyards have transitioned to organic farming practices, avoiding the use of synthetic pesticides and fertilizers, and instead relying on natural products and processes to maintain soil fertility and plant health; (3) Cover Cropping: planting cover crops between vine rows helps prevent soil erosion, improve soil structure and fertility, enhance water retention, and promote biodiversity within the vineyard ecosystem; (4) Water Management: efficient irrigation systems, such as drip irrigation, are utilized to conserve water. Some vineyards also collect and reuse rainwater; (5) Soil Management: practices such as reduced tillage or no-till farming help preserve soil structure, reduce erosion, and maintain healthy soil microbiology; (6) Biodiversity Conservation: efforts to maintain or enhance biodiversity include

preserving natural habitats around vineyards, planting hedgerows and trees, and encouraging beneficial insects and wildlife; (7) Sustainable Packaging: the use of lightweight bottles, recyclable materials, and biodegradable packaging contributes to reducing the carbon footprint of wine production and distribution; (8) Carbon Footprint Reduction: measures such as optimizing transportation logistics, using renewable energy sources, and improving energy efficiency in wineries are aimed at reducing greenhouse gas emissions; (9) Social Sustainability: beyond environmental concerns, sustainable viticulture in Romania also encompasses fair labor practices, community engagement, and preserving the cultural heritage of winemaking.

These eco-friendly viticultural techniques not only contribute to the sustainability of the Romanian wine sector but also enhance the quality of the wine by reflecting the unique terroir of each wine region.

After an analysis of the Romanian legislation, regarding organic agriculture, it shows that the European Council Regulation is respected; the conversion from the conventional agriculture system to organic agriculture is done according to:

O.U.G. regarding ecological agri-food products no. 34/17 April 2000, H.G. no. 913 of September 13, 2001 on „Methodological norms for applying the provisions of O.U.G. no. 34/2000”, Order M.A.P.D.R. no. 417 of September 13, 2002”, regarding the „Specific rules on the labelling of organic agri-food products”; The order of the M.A.P.D.R. no. 527 of 13 August 2003, for the approval of the „Rules on the Inspection and Certification System and the conditions for accreditation of inspection and certification bodies in organic agriculture”; The order of the M.A.P.D.R. no. 721 of September 26, 2003 for the approval of the „Rules on the Import and Export of organic agri-food products”; The order of the M.A.P.D.R. no. 190 of June 28, 2006, on amending and supplementing the annex to the Order of the Minister of Agriculture, Food and Forests and the President of the National Authority for Consumer Protection no. Order no. 986/2016 on the approval of the amount of the fee for the approval of inspection and certification bodies in organic agriculture; Order no. 464/2019 for the approval of the national rules regarding the import of ecological products from third countries on the Romanian territory; Organic regulations are also used, such as: EU Regulations 834/2007, 889/2009, 710/2009, 625/2017, 848/2018 to which are added other similar regulations on protection against emissions to soil, water and air, biodiversity development and Commission Implementing Regulation (EU) 2021/279, dated 22 February 2021, establishes comprehensive guidelines for the execution of Regulation (EU) 2018/848 by the European Parliament and the Council, focusing on controls and various measures to guarantee traceability and adherence in the organic production process and the labeling of organic items.

In the present, the role of organic farming has developed. The EU target of having 25% organic land by 2030 of total agricultural land, as well as measures to stimulate demand for organic products through promotion schemes and green public procurement are guidelines for Romania and must be taken into consideration. In addition, Jan Plagge, president of the European organic movement (IFOAM EU) has stated: „European Union set itself a target of 25% organic land by 2030 through an ambitious Farm to Fork strategy, putting organic at the heart of a transition to sustainable and fair food systems. This is a clear recognition of the benefits of the organic food and farm system for society and our planet. But much remains to be done and we have no time to waste to make the European food system and agriculture more resilient” (IFOAM EU, 2020).

In these circumstances, Romania, which currently owns only 2% of land cultivated in organic agriculture, will have to adopt sustainable development policies. Organic farming could be a model of sustainable agriculture. Investing in organic farming could also be a profitable strategic area in Romania's National Export Strategy.

Results and discussions

Regarding the extent of vineyard cultivation, Romania holds the fifth position within the European context and the tenth position on a global scale (OIV 2023). As for the volume of wine production, Romania secures the sixth place among European countries and ranks twelfth globally (OIV 2023).

These figures, related to the area under vine cultivation and wine output, situate Romania prominently within the global viticultural landscape. Yet, from the perspectives of productivity and sustainability, our position does not reflect our full potential. Taking into account that from the aggregate cultivated volume of 3,957.7 th.hl., merely 2,382.03 th.hl., consist of varieties designated under Denomination of Controlled Origin (DOC) and Geographical Indication (IG), the residual production is attributed to wines derived from interspecific hybrid grapes (Romanian Ministry of Agriculture and Rural Development 2020).

The absence of industry cohesion adversely influences both trade and the sector's sustainable advancement. Nonetheless, Romania is making efforts to conform to European directives concerning the sustainable evolution of viticulture. Romania has taken several actions to promote sustainable viticulture, aligning with European Union directives and its own national strategies for agriculture and environmental protection. These actions aim to enhance the sustainability of the wine sector, improve environmental outcomes, and ensure the sector's long-term viability. Here's an overview of key initiatives and measures Romania has implemented:

1. **Adoption of EU Regulations and Directives.** Romania, as an EU member state, adheres to EU-wide regulations and directives that promote sustainable agricultural practices, including those applicable to viticulture. This includes the implementation of the Common Agricultural Policy (CAP), the European Green Deal initiatives such as the Farm to Fork Strategy, and regulations on organic production and integrated pest management (IPM).
2. **Support for Organic Viticulture.** The Romanian government encourages organic viticulture through various support mechanisms under the CAP's rural development programs. This includes financial incentives for farmers to convert to and maintain organic farming practices, which are less harmful to the environment and promote biodiversity.
3. **Integrated Pest Management (IPM).** Consistent with EU Directive 2009/128/EC regarding the sustainable use of pesticides, Romania advocates for the adoption of Integrated Pest Management (IPM) practices among its viticulturists. IPM emphasizes the use of non-chemical methods for pest control and requires the judicious and minimized use of chemical pesticides only when necessary, reducing the environmental impact of viticulture.
4. **National Programs for Vine and Wine.** Romania has developed specific national programs to support the vine and wine sector, focusing on improving product quality, competitiveness, and sustainability. These programs include funding for research and innovation in sustainable viticulture practices, vineyard modernization, and the promotion of Romanian wines both domestically and internationally.
5. **Water and Soil Management.** Efforts to promote sustainable water use and soil management in viticulture are part of Romania's adherence to the EU Water Framework Directive and its national strategies for environmental protection. This includes measures to prevent soil erosion, improve water efficiency in irrigation, and manage vineyard runoff to protect water quality.
6. **Education and Training.** The Romanian government, along with academic institutions and industry associations, provides education and training programs for vine growers on

sustainable viticulture practices. These programs cover organic farming, IPM, soil and water conservation techniques, and the use of renewable energy sources in winemaking processes.

7. Promotion of Biodiversity. Initiatives to maintain and enhance biodiversity in and around vineyards are also part of Romania's strategy for sustainable viticulture. This includes the planting of cover crops, maintenance of natural habitats for beneficial insects, and the conservation of traditional grape varieties that are well-adapted to local conditions.
8. Research and Innovation. Romania invests in research and innovation to develop more sustainable viticulture practices, including the study of grape varieties resistant to pests and diseases, reducing the need for chemical treatments, and exploring sustainable winemaking technologies.
9. Climate Change Adaptation. Recognizing the impact of climate change on viticulture, Romania is developing strategies for adaptation. This includes selecting grape varieties that are more resilient to climate stressors, optimizing vineyard microclimates, and implementing practices to reduce the carbon footprint of wine production.

Romania's actions to promote sustainable viticulture reflect a comprehensive approach that integrates EU directives with national initiatives. By supporting organic farming, implementing integrated pest management, investing in research and education, and promoting biodiversity and environmental protection, Romania is working towards a sustainable future for its wine sector. These efforts not only aim to enhance the environmental sustainability of viticulture but also to improve the quality of Romanian wines and the competitiveness of the sector in the global market. According to European guidelines a path towards sustainability is inevitable for the future of agriculture.

A change towards improved technologies focused on monitoring and controlling wine quality can improve food security. All the steps taken towards sustainable practices in wine making will eventually help the three pillars of sustainability: economy, environment and society. Given the complexity of the subject, Romanian authorities should come in support of the Romanian wine producers with actions meant to inform and develop sustainable practices.

Currently, in Romania, although the quality of the soil is recognized and the crops are resistant to drought, the organic farming sector is not sufficiently financed. Farmers need to be rewarded for the contribution of their work to the conservation of natural resources, necessary for the benefits offered by the conversion and ecological maintenance of the soil. This may include relief measures and schemes to promote and increase the share of consumption of organic products in schools and hospitals - by GPP (Green) is a smart choice because this approach "push-pull" has proved successful for agricultural development in countries such as Denmark.

In Romania, the first step has been taken, namely: the development of the first Romanian standard for ecological agriculture: SR 13595 – Ecological agriculture. Requirements and recommendations for sustainable organic products (2022). The standard is part of the national standardization efforts to support the European Union in achieving the objectives contained in the European Green Deal and in the London Declaration that the European standardization community has assumed and which aims to develop standards to support the fight against climate change.

Standard will link the global "One Health" movement with ecological agriculture, by achieving objectives related to soil, water and air quality, and from an economic point of view, new markets and new supply chains would be developed. For this, the economic, public and private actors represented by the business environment (producers, traders, suppliers, consumer associations, processors), together with universities, research-innovation entities as well as certification bodies, must associate and cooperate.

Increasing cohesion through cooperation and knowledge transfer will help to: develop concrete plans to adapt agri-food products to European legislation and standards; supporting the adaptation of economic agents' behavior and their development in the cross-border competitive environment.

Conclusion

The article presents a comprehensive examination of the Romanian wine and organic agricultural sectors, emphasizing the importance of sustainable development to address both current and future challenges. It reaffirms the critical role that sustainable agriculture occupies in tackling global challenges, including climate change, decline in biological diversity, nutritional security. It underscores the necessity for agricultural practices to evolve towards sustainability to ensure long-term viability and health of ecosystems. Romania's significant position in the global wine industry, coupled with its challenges in terms of visibility and export, showcases the potential for growth through sustainable practices. The article suggests that a shift towards sustainable development could enhance the Romanian wine sector's competitiveness and resilience against global challenges. It points out the significant impact of EU funding and policies in promoting sustainable agriculture and organic farming. It mentions specific EU strategies and financial allocations aimed at supporting the development of a more resilient and sustainable agricultural sector. Despite the opportunities, the article acknowledges the challenges faced by the agricultural sector, including financial constraints, the need for education on quality wine consumption, and the adoption of sustainable practices. It suggests the development of a long-term common strategy involving all stakeholders in the wine industry and the need for national standards to ensure sustainability and competitiveness. The article observes a growing orientation towards sustainability in the wine industry, driven by sustainable viticultural practices, consumer demand, and regulatory interest. Adopting eco-friendly viticultural techniques contributes to the sustainability of the Romanian wine sector and enhances wine quality. These practices, including organic viticulture, integrated pest management, and water conservation, that help preserve the environment and ensure the long-term health of vineyards.

In Romania, the standard will support the sector by employing operators (farmers and processors) with credible certifications. This will have a positive influence on the active insertion of ecological agriculture in the efforts to maintain and develop rural areas in Romania, will improve the image of the ecological sector at the national level and will encourage exports from all regions of the country. In the medium and long term, the application of regulations and compliance with the national standard for organic farming can help solve problems such as climate change, global warming, deforestation, loss of biodiversity. They will also have the effect of reducing costs, increasing the benefits of operators in the system, improving human health by increasing the consumption of healthy food products, improving the quality of the environment, climate, biodiversity, animal welfare and the conservation of natural resources.

In conclusion, the article effectively outlines the necessity for a shift towards sustainable agriculture and organic farming in Romania, highlighting the potential benefits for environmental conservation, economic growth, and societal well-being. It calls for collaborative efforts among government, industry stakeholders, and the community to achieve sustainable development goals in the agricultural sector.

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