
THE ROLE OF THE VITICULTURE AND WINE SECTOR IN RURAL DEVELOPMENT AND THE AGRO-FOOD ECONOMY: EVIDENCE FROM NORTH MACEDONIA

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ABSTRACT

Viticulture and wine production represent a strategically important segment of the agri-food economy of North Macedonia, combining economic, social and territorial functions. This paper analyses the structural characteristics, economic performance and developmental role of the viticulture and wine sector, with particular emphasis on its contribution to rural development, exports and land use sustainability. The study is based on the analysis of secondary data obtained from the State Statistical Office of the Republic of North Macedonia, complemented by policy documents and relevant scientific literature. The results indicate that the sector plays a significant role in agricultural output and export performance, accounting for a substantial share of agri-food exports and providing income for approximately 20,000 rural households. The paper concludes that viticulture and winemaking function as a permanent agricultural system with relevance for agroforestry and sustainable land-use frameworks.

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Introduction

Viticulture and wine production represent one of the most enduring and recognisable segments of agriculture and the agri-food industry in North Macedonia. Historical and archaeological evidence indicates a long-standing continuity of grape cultivation and wine production dating back to antiquity and the Roman period, while wine has also occupied an important place in the cultural and religious practices of the region. This long-term historical development has created a strong cultural and symbolic foundation upon which the contemporary viticulture and wine sector has been built. Unfortunately, in Macedonia, the wine culture is still at a very low level and continues the tradition of production and consumption of domestic poor quality wine, especially outside Skopje. (Risteska et al 2018)

Beyond its cultural significance, viticulture and winemaking have acquired a pronounced economic and strategic role in the country's agri-food economy over recent decades. According to official trade data, wine consistently ranks among the leading agri-food export products, alongside tobacco, accounting for a substantial share of foreign exchange earnings from agricultural exports. National strategies for agriculture, exports and rural development explicitly identify wine as a strategic product with high potential for value addition, branding and international competitiveness.

The economic importance of the sector extends well beyond export performance alone. Regional analyses for the Western Balkans suggest that grape production, together with the wine industry, contributes approximately 17–20% of the agricultural sector's share in the gross domestic product of North Macedonia (Beleski, 2019; International Trade Administration, 2024). Grape and wine production generate significant value added within agriculture and provide income for a large number of rural households. The sector is characterised by a structure in which numerous small-scale individual grape growers coexist with a relatively concentrated processing segment dominated by medium-sized and large wineries. This structure gives the sector a particular social and developmental relevance, especially in rural areas where viticulture represents a key source of income.

In recent years, the viticulture and wine sector has increasingly been linked to tourism, regional branding and the international promotion of the country. The development of wine tourism, wine routes and integrated gastronomic offerings generates additional economic effects and creates opportunities for rural economic diversification. Research on wine tourism in North Macedonia suggests that wineries, wine trails and wine-related experiences can generate supplementary economic benefits, contribute to rural diversification and enhance the recognition of wine regions as tourist destinations (Kitanov, 2024).

At the same time, the sector faces a range of structural and external challenges, including fragmented vineyard ownership, a historical orientation towards bulk wine production, climate change, and shifting consumer preferences in global markets.

The geographical diversity and climatic conditions of North Macedonia provide favourable conditions for grape cultivation (Angelovska et al., 2022). According to Invest North Macedonia, the country is divided into three main wine regions: the central Vardar River Valley region, covering approximately 24,664 hectares (87% of total vineyard area), the Western Pelagonia–Polog region with 1,817 hectares, and the Eastern Pčinja–Osogovo region with 1,733 hectares. The total vineyard area amounts to approximately 33,423 hectares, of which around 28,213 hectares are dedicated to wine grapes (Invest North Macedonia, n.d.). These figures highlight the dominance of the Vardar Valley and explain the spatial concentration of wineries in this region.

Local grape varieties thrive under these conditions. Red varieties such as Vranec, Prokupac and Gamay continue to dominate the red wine segment, while Cabernet Sauvignon, Merlot and Pinot Noir have gained importance in recent years. Among white grapes, the autochthonous varieties Smederevka and Žilavka remain widely cultivated alongside international varieties such as Riesling, Chardonnay and Sauvignon Blanc. Invest North Macedonia identifies Vranec as the leading grape variety in the country. This combination of local and international varieties provides producers with flexibility to target both domestic and export markets.

The Standing Working Group for Regional Rural Development reports that vineyards in North Macedonia account for approximately 40% of total vineyard areas in the Western Balkans. In 2020, the country reported 28,213 hectares of vineyards, significantly exceeding Serbia (19,840 hectares) and Albania (12,007 hectares) (Beleski et al., 2023). The same report highlights that North Macedonia recorded 129.35 hectares under conversion to organic production—the highest figure in the region—and 17.6 hectares already certified as organic (Beleski et al., 2023). These figures indicate both the scale of the sector and a modest but growing shift towards organic viticulture.

According to available estimates, the country has approximately 99 registered wineries producing slightly over 100 million litres of wine annually. Vineyard management involves around 20,000 individual grape growers alongside a smaller number of large companies. Wine grape varieties account for approximately 85% of all vineyards, while the remaining 15% are planted with table grapes (Invest North Macedonia, n.d.). Annual harvests yield up to 125,000 tonnes of grapes (Invest North Macedonia, 2021). Approximately 40% of wine production is bottled, while around 60% is sold in bulk (Invest North Macedonia, 2021).

Manevska-Tasevska (2006) argues that the sector's main strengths lie in favourable natural conditions and a skilled labour force, while its weaknesses stem from insufficient investment in infrastructure and weak management strategies. Using Porter's diamond model, the author demonstrates that domestic demand, related industries and factor conditions provide competitive advantages, whereas support policies and industry organisation require improvement. Although dated, covering the period 1995–2004, this study continues to offer a relevant theoretical framework for analysing contemporary challenges.

Government policies and international cooperation play a crucial role in the development of viticulture and winemaking. The EU accession process has influenced regulatory frameworks and market access conditions. Manevska-Tasevska (2006) notes that the Stabilisation and Association Agreement enabled North Macedonia to export 300,000 hectolitres of wine to the EU at zero tariff during the transition period. While this preferential quota supported producers, it also reduced incentives to upgrade quality. More recent strategies emphasise diversification towards bottled wine and higher value-added segments. The 2023 SWG report underscores the expansion of organic vineyards and highlights the need for measures supporting certification, conversion and marketing (Beleski et al., 2023).

Wine tourism has emerged as a complementary activity capable of adding value to grape and wine production. Winery visits, tasting experiences, and the integration of gastronomy and landscape are key elements of the tourism product (Carlsen & Charters, 2006; Nickova, 2021). Wine tourism thus connects agriculture, culture, and hospitality and is recognised as an effective instrument for rural diversification, generating multiplier effects through the integration of agriculture, tourism, and local gastronomy (Hall et al., 2000; Getz & Brown, 2006)

The aim of this paper is to analyse the economic, structural and developmental role of the viticulture and wine sector in North Macedonia and to argue its position as a strategic pillar of the agri-food economy. Through a synthesis of official statistical data, relevant policy documents and existing scientific studies, the paper seeks to demonstrate how the sector contributes to agricultural production, exports, rural incomes and national branding. By systematising available information, the study provides an analytical basis for informed discussions on future development priorities and policy directions in viticulture and winemaking.

Materials and methods

The methodology is based on the analysis of secondary data obtained from the State Statistical Office of the Republic of North Macedonia. The study uses annual datasets on agricultural production, vineyard areas, grape purchase and sales, as well as wine production and exports by year. Data were compared across different years in order to identify trends, growth or decline, and structural changes within the sector. Simple comparative tables and descriptive indicators were employed to illustrate production dynamics and the economic significance of the viticulture and wine sector.

Results and discussion

Results

The analysis of secondary data from the State Statistical Office and relevant institutional sources indicates that the viticulture and wine sector occupies a stable and significant position within the agri-food economy of North Macedonia, while simultaneously facing structural constraints that affect its long-term competitiveness.

Vineyard area and production structure

Table 1. Productional areas, total production and yield of vineyards in North Macedonia (2014-2024)

Year	Harvested areas (ha)	Total production (tones)	Average yield (kg/ha)
2014	22 918	195 888	8 620
2015	23 192	324 769	14 171
2016	23 192 (≈)	333 319	14 372
2018	23 670	294 497	12 442
2019	23 996	258 960	10 792
2020	23 709	317 550	13 394
2021	19 384	269 131	11 509
2022	23 047	265 556	11 522
2023	21 972	149 006	6 782
2024	21 534	205 571	9546

Source: State Statistical Office of the Republic of North Macedonia – *MAK-STAT database*

The data show that vineyard areas have remained relatively stable, fluctuating around 22,000–24,000 hectares, with 21,534 hectares recorded in 2024. Total production volumes exhibit considerable variability, with peak production in 2015 and 2016 and a notably weak harvest in 2023. Average yields range between 8,620 and 14,372 kg/ha, reflecting sensitivity to climatic conditions and vineyard management practices.

Table 2. Number of vine stocks (total and native) in North Macedonia (2014-2024)

Year	Total number of vine stocks ('000)	Number of native vine stocks ('000)
2014	86 313	84 481
2015	87 668	85 950
2016	87 668 (≈)	85 950 (≈)
2018	88 356	86 591
2019	88 520	86 387
2020	85 597	84 280
2021	89 817	87 954
2022	83 709	82 062
2023	80 510	78 778
2024	79 314	77 046

Source: State Statistical Office of the Republic of North Macedonia – *MAK-STAT database*

The number of vine stocks has gradually declined over the observed period, primarily due to vineyard ageing, recultivation and replanting. More than one-third of vineyards are older than 30 years, while only around 2% of the total area is under organic conversion (SWG, 2023), indicating significant scope for structural renewal and sustainability-oriented investment.

Table 3. Main Wine Regions in North Macedonia, Climatic Characteristics, and Dominant Grape Varieties

Wine Region	General Climatic Conditions	Dominant Varieties
Tikveš (Central Vardar)	The warmest and driest region with a long growing season (average annual > 2,700 sunshine hours)	Vranec, Kratošija, Smederevka, Temjanika
Skopje Region	Moderate continental climate with mild summer temperatures and relatively cool nights	Smederevka, Chardonnay, Cabernet Sauvignon
Veles (Vardar) Valley	Warm and dry, with gentle relief	Vranec, Cabernet Sauvignon, Rkaciteli
Pelagonia–Polog Region	Mountain climate with lower temperatures and higher precipitation; suitable for late varieties	Vranec, Cabernet Sauvignon, Riesling
Eastern Region (Bregalnica, Tikveš, Štip)	Warm and semi-dry with larger temperature differences during the day	Vranec, Smederevka, Sauvignon Blanc

Source: Metodijeski et al, 2020

North Macedonia is divided into several wine regions with different microclimates. Tikveš Valley is the most fertile region, covering over half of the vineyard area and dominated by Vranec. The regions around Skopje and Veles produce a variety of white and red grapes, while the mountainous Pelagonia–Polog region yields fresh and acidic wines.

Table 4. Age Structure of Vineyards and Organic Production (2023)

Category	Share of Total Area (%)
Vines aged < 10 years	~24%
Vines aged 10–30 years	~41%
Vines aged > 30 years	~34%
Vineyards under organic conversion	~2%

Source: SWG, 2023

The analysis of vineyard areas shows that viticulture in North Macedonia is a relatively stable sector in terms of land coverage, with total areas around 33–34 thousand hectares in recent years. Wine grape varieties dominate, accounting for approximately 85% of the total area, while the remainder is table grapes. This structure confirms the strong orientation of the sector towards wine production rather than direct sales of fresh grapes. According to the regional Western Balkan report (SWG, 2023), Macedonian vineyards are relatively old: more than one-third of the vineyards are over 30 years old. Only about 2% of the area is undergoing organic conversion, indicating potential for growth in organic production.

Regional distribution is notably uneven. The central wine region, namely the Vardar Valley, concentrates about 87% of the total vineyard area, highlighting its dominant role in national production. This concentration allows economies of scale and the development of specialized infrastructure, but also increases the sector's vulnerability to regional climatic shocks.

Table 5. Key Economic Indicators of the Macedonian Wine Sector

Indicator	Value/Range
Share of viticulture and winemaking in agricultural added value	~17–20% of agricultural GDP
Share of wine exports in total agri-food exports	Second most significant export product after tobacco; around 15% of the value of agri-food exports
Total value of wine exports	≈ 50–60 million USD annually; >80% intended for export
Number of registered wineries	70–80 production facilities (from small family-run to large industrial)
Main export markets	Germany, Croatia, Poland, Serbia, China, USA

Source: Beleski, 2019

Grape and wine production, export performance and regional comparison

Annual grape production reaches up to 120–125 thousand tonnes, with most grapes purchased by wineries, confirming strong vertical integration between primary production and processing. Approximately 85% of wine production is exported, positioning the sector as one of the most export-oriented segments of North Macedonia's agri-food economy.

Table 6. Production and export in North Macedonia (2019–2024)

Year	Production(mhl)	Export (mhl)	Export share
2019	1,00	0,85	85 %
2020	0,90	0,77	85 %
2021	0,95	0,81	85 %
2022	0,90	0,77	85 %
2023	1,00	0,85	85 %
2024	1,00	0,85	85 %

Source: State Statistical Office of the Republic of North Macedonia – *MAK-STAT database*

According to official promotional materials, 99 registered wineries produce slightly over 100 million liters of wine annually. Another source reports annual production of approximately 90 million liters, with around 85% of the production exported. The table below uses a series with moderate fluctuations between 0.90 and 1.00 mhl to illustrate changes in recent years. Red grape varieties such as Vranec dominate the country, although white varieties like Smederevka and Žilavka are also cultivated.

Table 7. Wine Production and Export in Serbia (2019–2024)

Year	Production (mhl)	Export (mhl)*	Export Share (≈)	Ratio to Macedonia (Production)	Ratio to Macedonia (Export)
2019	0.62	0.31	50%	0.62	0.36
2020	0.56	0.28	50%	0.62	0.37
2021	0.54	0.27	50%	0.57	0.34
2022	0.46	0.23	50%	0.51	0.30
2023	0.44	0.22	50%	0.44	0.26
2024	0.41	0.21	50%	0.41	0.24

Source: Statistical Office of the Republic of Serbia

By 2023, Serbia had around 430 registered producers, with total production around 30 million liters per year. Statswine data show a gradual decline in production from 0.62 mhl in 2019 to 0.41 mhl in 2024. More than half of Serbian wine is exported, with roughly 5.5 million liters going to Russia (about one-third of exports) and 17% to the European Union. Main grape varieties include Prokupac, Grašac, and Tamjanika.

Table 8. Wine Production and Export in Montenegro (2019–2024)

Year	Production (mhl)	Export (mhl)	Export Share	Ratio to Macedonia (Production)	Ratio to Macedonia (Export)
2019	0,17	0,057	33 %	0,17	≈ 0,07
2020	0,17	0,057	33 %	0,19	≈ 0,07
2021	0,17	0,057	33 %	0,18	≈ 0,07
2022	0,17	0,057	33 %	0,19	≈ 0,07
2023	0,17	0,057	33 %	0,17	≈ 0,07
2024	0,17	0,057	33 %	0,17	≈ 0,07

Source: MONSTAT. (2024). *Montenegro wine production and export statistics*. Podgorica: Statistical Office of Montenegro.

Official data indicate that around 108 registered wineries on 2,850 ha produce about 17 million liters of wine annually and export 5.7 million liters. The largest producer is the state-owned company 13. Jul – Plantaže. The main Montenegrin variety is Vranac, while white wines are produced from Krstac and Žižak.

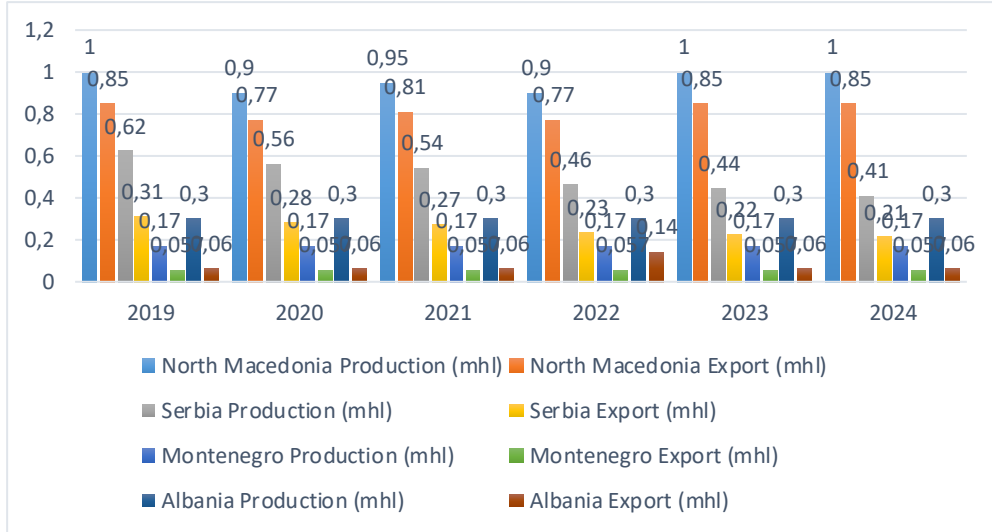
Table 9. Wine Production and Export in Albania (2019–2024)

Year	Production (mhl)	Export (mhl)	Export Share	Ratio to Macedonia (Production)	Ratio to Macedonia (Export)
2019	0,30	0,06	20 %	0,30	0,07
2020	0,30	0,06	20 %	0,33	0,08
2021	0,30	0,06	20 %	0,32	0,07
2022	0,30	0,14	46 %	0,33	0,18
2023	0,30	0,06	20 %	0,30	0,07
2024	0,30	0,06	20 %	0,30	0,07

Source: Wine production in Albania.” (2024). *Decanter Magazine*.

According to Decanter (2024), Albania has about 8,000 ha of vineyards and produces nearly 3 million liters of wine annually, with one-fifth exported. Ministry of Agriculture reports confirm that in 2022, 3.03 million liters were produced, with 46.4% exported. Indigenous varieties such as Kalmet, Sheshi, and Vlosh dominate production.

Figure 1. Comparison of wine production and wine export between different countries



The Figure 1 presents a year by year comparison of wine production and export volumes, expressed in million hectolitres, for North Macedonia, Serbia, Montenegro, and Albania over the period from 2019 to 2024. North Macedonia clearly stands out as the dominant producer among the four countries, with production fluctuating around one million hectolitres throughout the observed period. Its export volumes closely follow production levels, indicating a strong export orientation and a stable external demand for Macedonian wine. Serbia shows a noticeably lower production capacity compared to North Macedonia, with a gradual decline in production from 2019 onward. Export volumes follow the same downward pattern, reflecting a proportional relationship between domestic output and exports. This suggests that Serbian wine exports remain largely dependent on overall production trends rather than market expansion. Montenegro maintains a very stable production level across all years, with minimal variation. Export volumes remain consistently low, which points to a production structure focused primarily on the domestic market or limited export channels. Albania also demonstrates stable production figures, but with a notable increase in exports in 2022. This temporary rise suggests a short-term expansion in export activity, possibly driven by favorable market conditions or specific trade agreements, before returning to previous levels.

The analysis of trade data confirms that wine is among the leading agri-food export products of North Macedonia. In most years analyzed, wine ranks second in export value, just after tobacco, contributing significantly to total agricultural exports.

Globally, the viticulture and wine sector is considered one of the most internationalized segments of the agri-food economy, with strong export orientation and high sensitivity to quality, branding, and origin (Anderson & Nelgen, 2011; OIV, 2023).

Although export volumes are relatively stable, the structure shows a dominance of bulk wine exports, limiting the potential to increase export value without expanding physical volume. This highlights the need for strategic orientation toward bottled wine and higher-value segments, particularly in European Union markets.

Comparative analysis with Serbia, Montenegro and Albania shows that North Macedonia is the leading wine producer in the Western Balkans in terms of volume, with significantly higher export intensity. However, the dominance of bulk wine exports constrains export value growth and reinforces the need for a strategic shift towards bottled wine and higher value-added segments.

Table 10. Correlation Matrix Between Vineyard Area, Quantity, and Yield in North Macedonia (2014–2024)

Variable	Harvested Area (ha)	Total Production (t)	Average Yield (kg/ha)
Harvested Area (ha)	1.00	0.34	0.32
Total Production (t)	0.34	1.00	0.99
Average Yield (kg/ha)	0.32	0.99	1.00

Source: State Statistical Office of the Republic of North Macedonia. (2025). *Agricultural statistics 2014–2024*

Correlation analysis between vineyard area, total production, and average yield shows several clear relationships. The relationship between harvested area and total production is weak to moderate and positive ($r \approx 0.34$), indicating that during 2014–2024, increases in vineyard area were generally associated with higher grape quantities, though this is not the dominant factor. Similarly, the correlation between area and average yield is weak and positive ($r \approx 0.32$), suggesting that yield per hectare depends more on agronomic practices, vineyard age, and yearly climatic conditions rather than the total area planted.

The strongest correlation is between total production and average yield ($r \approx 0.99$), which is expected, as higher yields per hectare almost proportionally increase total harvested grapes, even when vineyard area changes minimally. This indicates that, while vineyard size is important, the key determinant of total production during the analyzed period is production intensity and yield levels rather than vineyard area alone.

Socio-economic significance and rural development

The sector involves approximately 20,000 individual grape growers, underscoring its importance for rural incomes and employment. Viticulture thus performs a dual function: as an export-oriented industry and as a mechanism of social stability in rural regions. Nevertheless, fragmented ownership and limited access to finance remain major constraints for small producers.

Emerging trends: organic production and wine tourism

Although organic viticulture still occupies a small share of total vineyard area, North Macedonia stands out regionally in terms of land under conversion to organic production (Willer & Lernoud, 2023). This indicates potential for product differentiation and access to niche markets. Wine tourism is also gradually developing as a complementary activity, contributing to regional branding and additional income generation.

Discussion

The results of the analysis confirm the central economic and developmental role of the viticulture and wine sector in the agri-food economy of North Macedonia, while also highlighting structural limitations that reduce its long-term competitive potential. Wine is confirmed as a strategic export product, playing a significant role in agricultural exports, in line with national and regional studies (Beleski, 2019; SWG, 2023).

The sector's structure, characterized by the coexistence of numerous small individual grape producers and a relatively concentrated processing segment, creates specific relationships within the agri-value chain. On one hand, this structure provides a broad social base and contributes significantly to rural livelihoods, consistent with sustainable rural development concepts. On the other hand, fragmented vineyard ownership, limited bargaining power of small producers, and constrained access to financial resources reduce efficiency and increase dependence on purchase prices, representing a long-term developmental risk (Metodijeski et al., 2020).

The analysis of production and export structure shows a dominance of bulk wine, which limits export value per unit of product (Tables 7–9). While this model provides stable market placement and foreign exchange inflow, it is less compatible with strategies based on quality, branding, and geographical differentiation. This finding aligns with Manevska-Tasevska, who concluded that the sector's competitive advantages derive from natural conditions and human capital, while weaknesses relate to institutional support, investment, and strategic management.

From the perspective of Porter's Diamond Model, factor conditions (climate, soil, autochthonous and adapted varieties) and related industries (processing, tourism, gastronomy) represent significant strengths. However, domestic demand conditions and firm strategies still do not create sufficient pressure for innovation or a shift toward higher value-added segments. This can be linked to a historical focus on mass production and the limited capacity of the domestic market to stimulate qualitative differentiation (Anderson, 2016; Anderson & Nelgen, 2011; OIV, 2023).

Results related to organic viticulture indicate potential pathways for diversification and increased sector resilience. Although organic production currently occupies a small share of total vineyard areas, the relatively high proportion of vineyards in conversion demonstrates interest and developmental potential, as eco-labeling and certification can create price premiums and market differentiation (Delmas & Grant, 2014; Reganold

& Wachter, 2016). Wine tourism, as a complementary activity, reinforces the idea that integrating agriculture with services can generate multiplier economic effects, increase local consumption, and contribute to regional and national branding (SWG, 2023).

From the perspective of land use and agroforestry-oriented development, viticulture can be regarded as a long-term, permanent agricultural system contributing to the stability of rural landscapes, the preservation of agricultural land, and continuity of rural employment. This dimension is particularly important in the context of climate change and increased market instability, where permanent plantations play a significant role in enhancing rural resilience (Table 10).

Globally, the viticulture and wine sector is considered one of the most internationalized segments of the agri-food economy, with strong export orientation and high sensitivity to quality, branding, and product origin (Anderson & Nelgen, 2011; OIV, 2023). In the context of North Macedonia, public policies play a key role in guiding sector development. Existing financial support measures are limited in effectiveness due to insufficient coordination, administrative barriers, and unequal access of small producers to financial instruments, highlighting the need for an integrated approach that links subsidies, investments, marketing, and rural development within a unified strategic framework.

Conclusion

The study confirms that viticulture and winemaking represent one of the key strategic pillars of North Macedonia's agri-food economy, with substantial contributions to agricultural output, exports, rural incomes and international visibility. While the sector benefits from favourable natural conditions and a long tradition, it remains predominantly oriented towards lower value-added production models.

At the same time, clear development opportunities exist. A transition towards bottled wine, terroir-based branding, expansion of organic viticulture and integration with wine tourism could significantly enhance value creation and sectoral resilience. Public policies should therefore adopt a more integrated approach, linking production support with quality improvement, investment, marketing and rural development, with particular attention to strengthening the position of small producers within the agri-food value chain.

Conflict of interests

The authors declare no conflict of interest.

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