Research Article

Assessment of wine tourism potential in the countries of the former Yugoslavia

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ARTICLE INFO

ABSTRACT

We conducted a study on the tourism potential of the wine-growing areas of the countries of the former Yugoslavia, a region that has undergone extensive economic and political changes. We propose a new analysis model based on the open data for the evaluation of the tourism potential in wine-growing areas and wineries. For the research purposes, open geodata available through Open Street Maps, Google Maps, CORINE Land Cover, Digital Elevation Model and official databases of the countries analysed were taken. The tourism evaluation of the potential was carried out using a multicriterial method and the Geographic Information System. The variables linked to the wine tourism activity are grouped into six main tourism factors (cultural attractions, accommodation offer, etc.). On the other hand, the potential for wine tourism in the vineyard areas and winery are calculated, and the results are translated into maps that identify the tourism variables and are captured in three potential maps: Tourism factors, Vineyards and Wineries:

  i) Tourism factor results highlight the areas with a high tourism potential that have a close connection with some tourism resources (sea, natural and heritage areas). The best scores were obtained in the wine-growing areas of Croatia and Slovenia, especially those located near the sea.
  ii) Vineyard areas with a high level of wine tourism are located in the similar areas, Dalmatia, Istria and border areas between Slovenia and Croatia.
  iii) Wineries with high tourism potential are located in Dalmatia and the Danube valley around Belgrade, and areas of Montenegro.

Management implications: The study identifies a series of specific measures for each of the former republics of Yugoslavia to improve wine tourism management. General measures for public and private managers are also proposed:

  i) Improving the training of farmers in tourism management.
  ii) Tourism promotion and creation of tourism packages for wine tourism, as well as gastronomy and nature.
  iii) Development of accommodation infrastructures and improvement of the internet network.
  iv) Search for segments of travellers interested in wine tourism, gastronomy and nature.
  v) Development of quality brands for the wine sector and wine tourism sector.

1. Introduction

The former Yugoslavia was of considerable importance in the cultivation of vineyards and wine production. The subsequent disintegration as a country and the different political and economic directions taken by the heirs of the former Yugoslavia have produced varied results; some countries have experienced significant economic growth and have joined the European Union, while others have remained somewhat on the fringes of these processes. One of the most interesting aspects is the progressive importance of wine tourism in the areas where vineyards are cultivated and the use of wineries for these activities. Rural areas are suffering a significant loss of population and economic activity, and wine tourism has come to partly alleviate these problems and also to protect and save numerous heritages, cultural and natural resources in these areas (Lukić et al., 2012).

Wine tourism has emerged as an effective solution for addressing rural depopulation in various regions. For instance, in the Douro Valley of Portugal, economic challenges had led to significant rural depopulation. However, the development of wine tourism, including investments in vineyard accommodations, wine cellars, and tourism infrastructure, revitalised the area by attracting international visitors. This influx has created job opportunities, encouraged population stabilisation, and preserved local cultural heritage (Correia et al., 2019; Nascimento-Santos et al., 2020). Napa Valley in California presents another example, where strategic investments in wine tourism infrastructure and high-profile events have boosted tourism revenue and local employment. These efforts have attracted new residents and established Napa Valley as a globally recognized wine destination, contributing to its overall development and population stabilisation (Tomay & Tuboly, 2022). These cases illustrate how wine tourism can effectively address rural depopulation by fostering economic growth, enhancing infrastructure, and preserving cultural heritage.

The aim of the research is to evaluate the tourism potential of the vineyard areas and wineries in former Yugoslavia for wine tourism. The territory of the former Yugoslavia is used as an example for comparison and potential development of vineyard regions. The analysed data maps and tables (Annex 2) will allow a ranking of the areas with the highest potentials, in order to design recommendations and actions to improve the wine tourism sector in the studied countries.

The study of the former Yugoslavia allows the analysis of areas with very distinctive internal contrasts, both geographically, culturally and economically. This research develops its own novel methodology that allows the analysis of all the components related to wine tourism, which takes into account both the wineries and vineyards, as well as the general tourist resources surrounding the wine tourist. This methodology can be used in further studies by other researchers.

2. Literature review

2.1. Wine production context in the former Yugoslavia

The territory of the former Yugoslavia is characterised by climatic contrasts between the northern part and mountainous areas, included in a continental climate with cold winters, and the southern part, with a clear Mediterranean influence. The areas of Mediterranean influence, both in the south and on the coast, and the central valleys of the former Yugoslavia are the most favourable areas for vine growing.

Yugoslavia has a long tradition of winemaking and viticulture, dating back to Roman times. At the beginning of the 20th century, vine cultivation covered more than 180,000 ha, with the main area located in Croatia (Lukić et al., 2012). Vine cultivation continued to grow in the following decades, reaching its peak in the 1950s (Štancl & Milat, 1984). At that time the main growing area was Serbia. In the following decades, there was a sharp decline in Croatia and Serbia, while the extent of cultivation was maintained in Montenegro and Northern Macedonia (Table 1).

Traditionally, the two major wine producers in Yugoslavia were Croatia and Serbia (Štancl & Milat, 1984). Recently there have been remarkable changes, on the one hand, Croatia has reduced their production, specialising in higher quality wines to compete in the EU; on the other hand, Serbia has also reduced its production due to production and market search problems, while Montenegro, Slovenia and North Macedonia maintains a remarkable production (Table 2).

In former socialist countries, including Yugoslavia, after the fall of communism, major social changes took place. After Tito's time and the transition to the capitalist system, there is abandonment. Large agricultural combines, social enterprises with large processing capacities are going bankrupt or failing. The changes that can be seen are the fragmentation of large areas under vineyards and the decline of large agricultural producers and factories, poor quality of wine production, and poor application of modern technology in the wine production process, as well as poor marketing, etc. (Jovanović et al., 2022, 2023).

In recent decades, Croatia and Slovenia have focused on the production of quality wines and the combination with other activities related to tourism, gastronomy and nature (Hanžek & Sušić, 2019). Wineries and wine tourism in Bosnia and Herzegovina have been affected by the war in the 1990s. Wine tourism in Serbia is still in its initial phase of development, with an unconsolidated wine tourism offer. There is only a good offer in Belgrade and nearby areas (Fig. 1). North Macedonia has a remarkable wine production and is developing a significant wine tourism offer. Montenegro concentrates its wine and wine tourism production around Lake Skadar and is also developing this tourism product.

Most vineyards and wineries in the former Yugoslavia are accessible for tours and are predominantly oriented towards wine tasting and purchasing. Based on the analysis of offerings and activities from the websites Tripadvisor (2024) and Winetourism.com (2024), activities are mainly focused on wine and food tasting specific to these regions in tasting rooms, tours of the premises and the immediate surroundings. However, wine tourism offerings of most wineries are based on the traditional approach: tasting wine and food and potentially purchasing by tourists, with no other activities being evident.

Table 1
Vineyard areas in the Former Yugoslavia 1912–2020 (000 ha).

Annual average	1912-1923[1]	1935-1939[1]	1951-1955[1]	1956-1960[1]	1971-1975[1]	1976-1980[1]	2020[2]
Serbia	65.2	87.6	128	125	110.9	102.5	19.8
Croatia	91.7	108.1	94.2	95.8	82.6	79.5	17.3[3]
Bosnia and Herzeg.	5.1	3.77	4.8	4.6	5.2	5	4.6
Slovenia	20.8	28.4	25.8	24.8	20.6	20.8	14.4[4]
North Macedonia	–	8	13.6	22.6	27.8	32.3	28.2
Montenegro	0.78	1	1	1	1.8	2.2	2.9
Kosovo	–	–	–	–	–	–	3.4
Total	183.58	236.87	267.4	273.8	248.9	242.3	90.7

Source: Štancl and Milat (1984)[1] (Period 1912–1980); Regional Rural Development Standing Working Group in SEE, 2023 (Serbia, Bosnia & Herzegovina, North Macedonia, Montenegro and Kosovo)[2]; Croatian Bureau of Statistics (2020) (Croatia)[3]; Statistical Office of Slovenia (2020) (Slovenia)[4]

Table 2
Wine production in the former Republic of Yugoslavia (hl).

Annual average	1935-1939[1]	1951-1955[1]	1956-1960[1]	1971-1975[1]	1976-1980[1]	2020[2]
Serbia	–	1,785,300	1,308,800	2,544,400	2,323,900	306,250
Croatia	2,140,000	1,840,400	2,116,000	2,191,700	2,469,400	726,000[3]
Bosnia and Herzeg.	–	465,700	539,600	568,200	200,400	577,750
Slovenia	–	43,100	76,300	137,200	631,700	676,000[4]
North Macedonia	–	91,600	175,600	676,900	1,034,500	788,270
Montenegro	–	13,300	15,500	29,200	40,500	102,060
Kosovo	–	–	–	–	–	80,250
Total	2,140,000	2,454,100	2,923,000	3,603,200	4,376,500	3,256,580

Source: Štancl and Milat (1984)[1] (Period 1935–1980); Regional Rural Development Standing Working Group in SEE] (2023) (Serbia, Bosnia & Herzegovina, North Macedonia, Montenegro and Kosovo)[2]; Croatian Bureau of Statistics (2020) (Croatia)[3]; Statistical Office of Slovenia (2020) (Slovenia)[4]

Fig. 1. Vineyards and grape production in Negotin region, Serbia. Source: Authors.

2.2. Wine tourism

Wine tourism is a heterogeneous agricultural product, as it encompasses knowledge about agricultural products and activities of viticulture together with knowledge about tourism activities (Mohammadi et al., 2024). Wine tourism is connected with rural areas, the use of agricultural land, activities such as wine tasting, visits to wineries, rural areas, and vineyard landscapes, all of which are part of agritourism activities (Gu et al., 2022). Wine tourism, as a branch of agritourism, focuses on visiting vineyards, wine tasting, and studying viticultural practices. Although wine tourism is part of the broader agritourism sector, it contributes to the economic development of wine regions and the promotion of local traditions (Quintela et al., 2023).

Wine tourism relies on several elements that are key to this tourism product. On the one hand, wine routes are one of the most common elements of this activity, allowing visitors to explore vineyards, wineries and local attractions (Getz & Brown, 2006). On the other hand, cultural aspects include the connection of wine with local heritage and traditions, while the economic impact of wine tourism involves the creation of jobs and increased income in local communities (Vázquez-Vicente et al., 2021). Current research in wine tourism includes analysis of economic, cultural, and ecological aspects (Mitchell & Hall, 2006), and the use of advanced technologies for planning and promoting wine destinations (Garibaldi, 2022).

Wine tourism in Europe is characterised by its rich tradition, diverse wine regions, and well-developed infrastructure. Key countries such as France, Italy, and Spain lead in this segment. France, with regions like Bordeaux, Champagne, and Burgundy, attracts tourists with its top-quality wines, historic vineyards, and luxury tastings (Bruwer & Alant, 2009). Italy offers various wine routes in regions such as Tuscany and Piedmont, where visitors can enjoy local gastronomy and cultural heritage (Gatti & Incerti, 1997). Spain is known for its wine routes throughout the country, which combine wine tours with gastronomy and visits to places of cultural interest. The development of wine routes led to the creation of the Spanish Association of Wine Cities (ACEVIN, for its acronym in Spanish) in 1994. In 2022, 34 ACEVIN-certified routes were identified (Martínez-Falcó et al., 2023). López-Guzmán et al. (2009) focus on how wine routes contribute to tourism development in Spain, emphasizing the integration of cultural heritage and economic benefits. Even European countries with little wine tradition such as Poland are developing wine tourism activities (Makowski & Miętkiewska-Brynda, 2015).

Wine tourism in the Balkan countries neighbouring the studied republics is in a process of increasing development and with different stages of development. Romania is an important wine producer (10th largest wine producer in Europe) with notable wine producing areas such as Dealu Mare, Murfatlar, Cotnari, Târnave, etc., where some wine tourism routes have been consolidated. Romania has 46 Protected Designations of Origin (PDOs) for wine. Some authors point out the importance of Romania as a relevant wine tourism destination (Adrian, 2014; Tănase et al., 2022) although it still needs to grow and improve infrastructures (Nedelcu, 2014). Wine tourism is at an intermediate level of development in Bulgaria. The main producing areas are in the Danube Valley, Struma Valley and Thrace. Bulgaria has 52 PDOs for wine. Despite the favourable climatic conditions and cultural resources, wine tourism shows limited development (Slavova & Peyceva, 2017). Greece has a variety of wine destinations, including the Peloponnese, Crete, and Macedonia and it has 33 PDOs for wine. Greece is an outstanding wine tourism destination in the region. The country has a remarkable wine production in Europe and has developed wine tours, wine festivals and wine tourism destinations. The strong tourism development experienced in recent years has favoured the consolidation of Greece in a medium position as a wine tourism destination (Niavis et al., 2020, pp. 947–955; Pitoska, 2014).

Globally, wine tourism is developing in countries like the United States (California), Australia, South Africa, and Argentina. California, particularly Napa Valley, offers sophisticated wine tours that combine premium wine production with luxury accommodations and gastronomy (Skinner, 2009). Australia, with regions like Barossa and Hunter Valley, attracts tourists with its unique wines and stunning landscapes (Alonso & Liu, 2011). South Africa provides an authentic wine tourism experience in the Stellenbosch region, where wineries focus on sustainable practices and biodiversity conservation (O'Neill & Charters, 2000). Argentina, especially Mendoza, offers impressive wine tours with spectacular views of the Andes (Schlüter & Norrild, 2015).

Hall et al. (2009) highlighted the close relationships between economic impact and wine tourism. The relationship between economic impact and agritourism is one of the most studied topics, especially in developed countries, with special attention being paid to supporting small agricultural farms (Ndhlovu & Dube, 2024). The combination of agricultural or livestock activity with other activities seems to have become one of the few opportunities to maintain small farms in developed countries (Ndhlovu & Dube, 2024). Various studies have highlighted the connection between agritourism (which includes wine tourism) and local development, one of the most frequently mentioned theories in the field of rural development (Sgroi et al., 2018). Agritourism and wine tourism sector has focused its economic activity model on sustainable development as a way to save its business and adapt to the demands of travelers and public administrations (Montella, 2017). Sustainable development has been gaining importance in wine tourism

as an element of management of agricultural activity and as an element of support for local communities (Sigala, 2014). In the most disadvantaged agricultural areas such as mountainous areas with uneven terrain, which are very abundant in the study area, their tourism development is more closely linked to the sustainable development model (Ng, 2022). Wine tourism has become a very important tool for local economic development, due to the prestige that wine has in urban segments with high purchasing power. In addition, wine tourism has a remarkable capacity to be combined with various local tourism products (gastronomy, crafts, active tourism and nature activities, etc.) (Correia & Brito, 2016).

On the other hand, one aspect that is considered of special importance is the profile of the wine tourist, as wine tourism is a rather specialised tourism product. The general profile of wine tourists varies according to age, education, country of origin and purpose of the trip. Wine tourists tend to be educated, middle to high income, between 30 and 60 years old, and looking for authentic experiences through wine and local traditions. There are different profiles of wine tourists: diehards, who are deeply committed to exploring wine; food enthusiasts, who are looking for combinations of wine with high quality cuisine; cultural explorers, who are interested in local traditions; adventurers, who explore undiscovered destinations; and luxury travellers, who want exclusive experiences (Getz & Brown, 2006; Sigala, 2014).

2.3. Tourism potentials and methods

There are not many studies on the analysis of tourism potential linked to rural or natural areas in the countries of the former Yugoslavia. Among the research identified, the following can be highlighted.

i) Puška et al. (2021) investigated the evaluation of rural tourism development and its approach towards responsible use of natural and cultural resources in Brčko District (Bosnia and Herzegovina). For this analysis, they used the multi-criteria decision analysis (MCDA) method and applied fuzzy logic.

(ii) Vujović et al. (2023) analysed the tourism potential of mountainous areas in the Šavnik region (Montenegro). This analysis was based on the use of the V-Wert method of evaluation of natural potentials for recreational tourism purposes.

iii) Nestoroska (2012) analyses the tourism potential of the regions of the Republic of North Macedonia. This research identifies tourism activities for tourism development based on rural, nature, wine, and cultural tourism.

(iv) Gosar and Cigale (2015) analyse the geographical characteristics of Slovenia for tourism development through various factors with an emphasis on political and economic factors.

(v) Vulević et al. (2024) examine natural and cultural resources to determine the potential for geotourism development in the Danube region of Serbia. The method of analysis in geostatistical and machine learning tools to identify concentrations of geotourism resources.

(vi) Šetka and Pejdo (2023) explored potential forms of tourism in the Lower Neretva Region using surface analysis and tourist resource inventory via GIS.

(vii) Banožić et al. (2015) used mapping of tourist potentials in inland Croatia to support regional tourism development, enabling strategic planning through the visualisation of tourism resources at the regional level. Regarding the evaluation of the potential of wine tourism, we can mention some significant studies in the Tabla 3.

When evaluating the potential of wine tourism, various authors have contributed to understanding how different factors influence the development of wine tourism and have provided methodologies to evaluate its potential. Much of the research combines qualitative and quantitative methods. In qualitative methods, interviews and thematic

analysis stand out, providing in-depth insights into stakeholder perspectives and thematic patterns in data. Notable examples include Montella (2017), who used qualitative analysis to explore the integration of sustainable practices in wine production and marketing, and López-Guzmán et al. (2011), who employed qualitative methods to analyse the role of wine routes in tourism development and their contribution to sustainability. In quantitative methods, the main techniques are mapping analysis and multi-criteria evaluations. Gergelová et al. (2017) applied GIS tools for spatial analysis, focusing on mapping and assessing wine tourism potential in Slovakia. Maracajá et al. (2022) utilised a multi-criteria model combining quantitative and statistical methods to evaluate winery performance and tourism potential. Surveys and questionnaires were also used to gather data on consumer preferences. Brown and Getz (2005) employed surveys and questionnaires to study the influence of wine preferences on tourism destinations. Additionally, literature reviews provided a comprehensive analysis of various factors affecting wine tourism. Mitchell and Hall (2006) conducted a literature review to analyse economic, cultural, and geographical factors impacting wine tourism development. Overall, the integration of qualitative methods offers insights into contextual and thematic aspects, while quantitative methods provide measurable and spatial analyses, contributing to a comprehensive understanding of wine tourism potential.

One of the most popular methods for the analysis of tourism potential or competitiveness is the use of multi-criteria methods. In most studies, the proposed decisions are aimed at improving the tourism management of tourism destinations. Numerous studies are related to the evaluation of the competitiveness of destinations (Crouch, 2011). This method can be applied to various types of destinations, whether they are urban destinations (Luštický et al., 2017), smart destinations (Wang et al., 2016) or ski resorts (Erbas, 2016) or wineries (Maracajá et al., 2022). One of the aspects that is most taken into account is the determination of the weights in the variables or factors. The estimation of weights usually involves expert panels, and in some cases, the Delphi method is used (Huang & Chi, 2015). Some studies use multicriteria in conjunction with the AHP (analytical hierarchy process) method to obtain tourism potentials (Rezvani et al., 2022).

3. Methodology, data and geographical context

3.1. Study area

The former Socialist Federal Republic of Yugoslavia (SFRY) consisted of 6 federal states: Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, North Macedonia, and Serbia, as well as 2 autonomous provinces, Vojvodina and Kosovo and Metohija (Serbia). The total area of the former Yugoslav republic was 255,804 km².

The vineyard area of Yugoslavia comprised 20 wine-growing regions, 190 wine-growing districts, 95 wineries, and 740 types of vines (Štancl & Milat, 1984). The current analysis in 2024 identifies 16 regions and 56 subregions. Regions are in the same colour (Fig. 2), and Annex 1 (Table 8) contains all the regions and sub-regions analysed. Based on CORINE (European Environment Agency, 2018), it was determined that the total vineyard area for the study area analysed is 765.08 km². The largest vineyard areas are located in Serbia (189.7 km²), Croatia (174.7 km²), Slovenia (149.5 km²) North Macedonia (134.3 km²). The smallest vineyard areas are located in Bosnia and Herzegovina (55.0 km²), Kosovo (32.5 km²) and Montenegro (29.7 km²) (Table 9).

Regarding wineries, there are a total of 474 registered wineries in the former Yugoslavia. The majority are in North Macedonia with 274, followed by Serbia with 100, Slovenia with 28, and Croatia with 28. The fewest wineries are in Montenegro with 17 and Bosnia and Herzegovina with 27 wineries (Google, 2024).

3.2. Analysis proposal

The proposal for estimating the tourism potential for wine tourism is based on the analysis of the vineyard areas and wineries, as well as the main tourism resources and infrastructures (Fig. 3). This second aspect is
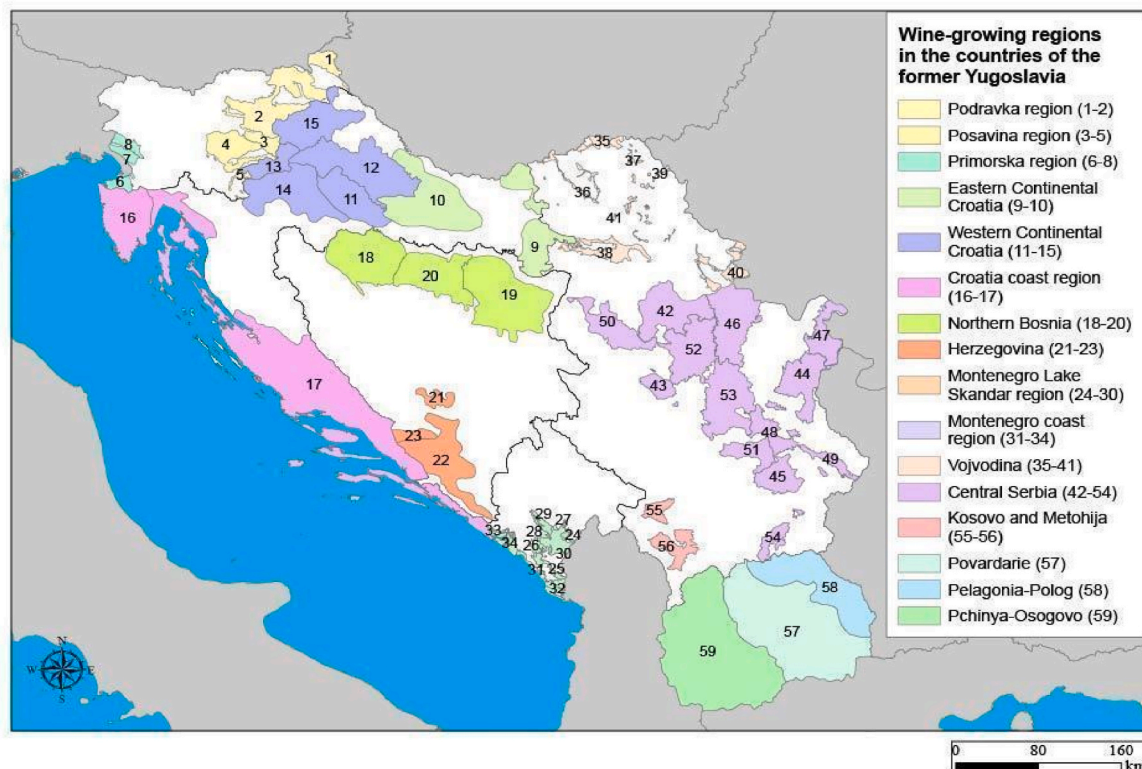
Fig. 2. Localization of regions and subregions in former Yugoslavia. Source: Authors.
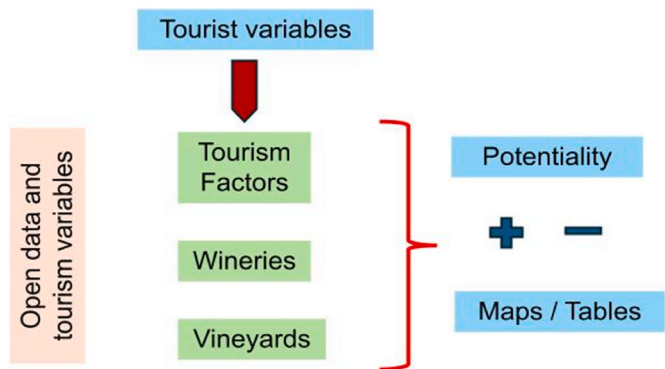
Fig. 3. Research proposal. Source: Authors.

done because we want to calculate the general tourist potential that surrounds the wine tourist, not only the most common aspects such as the wineries and vineyards.

Therefore, a new measurement proposal is developed, which takes into account these two aspects, and which is carried out after an analysis of the literature on the measurement of tourism potential in wine tourism (Table 3). This measurement tool combines a cartographic analysis of the three main aspects mentioned above (tourism variables, wineries and vineyards (Figs. 4–7) with a multi-criteria analysis method.

3.3. Data

1. Data on topography elements obtained from a Digital Elevation Model (DEM) was taken from The United States Geological Survey (USGS) (2024). DEM data provide information on topography, which is necessary for the assessment of natural resources.

2 Data on temperature, precipitation and insolation (for the period 2010–2020) were collected from NASA (2010-2020).

3. Data for cultural attractions, accessibility, supplementary offer, ancillary services, natural resources and lodgement supply were obtained from Open Street Maps (OSM) open data (OpenStreetMap Contributors, 2024). OSM was used to collect data on cultural attractions, accessibility, supplementary services, and auxiliary services. Data were not used directly, as this would lead to errors. The open data were analysed, filtered and tested for effectiveness. In almost all cases, they were cleaned and checked for correspondence with reality.

4. Data of wineries are taken from Google Maps open data. Open data of the wineries were analysed individually, eliminating the wine shops.

5. Data on vineyard areas obtained from CORINE Land Cover 2018. CORINE Land Cover (2018) allows for the identification of vineyard areas, thereby improving the accuracy of spatial distribution analysis of vineyard resources.

6. Data on the wine-growing regions of the former Yugoslavia were identified and digitised from the current wine and wine-growing maps which are the results of the work of the Ministry of Agriculture, the Ministry of Tourism, or the national statistical offices of the countries of the former Republic of Yugoslavia. Based on the regulations, criteria, and methods of the European Economic Area (EEA) and the International Organization of Vine and Wine (OIV), of which Yugoslavia was a member, the zoning and classification of the geographical origin of wines were carried out. The main factors for determining the zoning were: relief, soil, and climate. Based on this, the following units were identified: wine-growing region (the largest viticultural unit), wine-growing subregion, and wine-growing district (the smallest viticultural unit).

Table 3

Analysis of research in wine tourism potential. Source: Authors.

Author and Year	Article Title	Type of Method	Indicators wine tourism potential	Comments
Montella (2017)	Wine Tourism and Sustainability: A Review	Review, Qualitative	No indicators specified	The paper provides a comprehensive review of sustainability in wine tourism without specific indicators
López-Guzmán et al. (2011)	The Development of Wine Tourism in Spain.	Quantitative	Yes. Analyses trends, statistics, and development metrics	Focuses on the development of wine tourism using statistical and quantitative methods
Gergelová, Mixtaj, Labant, and Weiss, 2017	GIS tools for assessing wine tourism potential in Slovak Republic	Quantitative, GIS	Yes. Uses GIS tools to analyse spatial aspects of wine tourism potential	Employs GIS technology to map and evaluate wine tourism potential in detail
Maracajá et al., 2021	Multicriteria model from a tourism destination perspective	Multicriteria	Yes. Uses multiple criteria for evaluating tourism potential	Develops a multicriteria model to assess wineries from a tourism perspective
Brown & Getz, 2005	Linking Wine Preferences to the Choice of Wine Tourism Destinations	Quantitative	Yes. Statistical analysis on preferences	Examines the relationship between preferences and choice of destinations by quantitative data
Mitchell and Hall (2006)	Wine Tourism Research: The State of Play	Qualitative	No indicators specified	Provides an overview of the current state of wine tourism research, with no indicators
Ungureanu (2015)	Instrument for the valorization of wine tourism potential	Qualitative	No specific indicators design	Explores the impact of the wine road on tourism potential, using qualitative methods
Bogan and Iamandei (2021)	The valorization of the Romanian wine heritage	Quantitative	Yes. Analyses valorization metrics and heritage value	Examines how to valorize Romanian wine heritage, with quantitative metrics
Boatto et al. (2013)	Development of wine tourism destination	Quantitative	Yes. Assesses wine tourism development using quantitative data.	Focuses on the development of wine tourism in a specific area using quantitative methods
López-Guzmán et al. (2014)	Analysing the potential of wine tourism of Cape Verde	Qualitative	No specific indicators design	Analyses potential for wine tourism on the Island of Fogo using qualitative approaches
Lanfranchi et al. (2013)	A New Economic Model for Italian Farms: The Wine & Food Tourism	Qualitative	No specific indicators design	It develops a new economic model integrating wine and food tourism, with a qualitative approach
Santos et al. (2022)	Progress and Prospects for Research of Wine Tourism in Portugal	Quantitative	Yes. Discusses research progress and metrics in wine tourism	Reviews the progress and future prospects in wine tourism research in Portugal, using quantitative methods
Gómez-Carmona et al. (2023)	The Effect of the Wine Tourism Experience	Quantitative	Yes. Measures the impact of wine tourism experiences	Analyses the effect of wine tourism experiences on visitors using quantitative methods
Hudelson (2014)	Analysis potentiality of wine tourism in Balkans	Qualitative	No indicators specified	Evaluates the future potential for wine tourism in the Balkans with a qualitative approach

3.4. Instruments and measures. Identification of tourism potential factors

The instruments used in this research are intended to apply a multi-criteria method. The main program for data analysis was ArcGIS.10.8. The factors were calculated and identified in two steps.

a) **First**, the data were classified into 6 main factors: Cultural attractions, Accessibility, Complementary offer, Ancillary services, Natural resources and Accommodation offer. It is composed of 26 variables, such as monuments, natural areas, accommodation, etc. (Table 4). Numerous studies have classified tourism resources (Banozic et al., 2015; Gergeľová et al., 2017; Vulevic et al., 2024); we have taken these authors into account but have developed our own grouping. The variables in Table 4 were analysed according to three methodological procedures:

  (i) The first group of variables are geolocalized as points to generate a Kernel density map: Cultural Attractions, Complementary Offer, Accommodation Offer, Airport, Market, Shopping Centre and Tourist Offices variables.

  (ii) Protected Areas, Sport, Recreational Area and Lakes variables were geolocalized as polygons on the basis of which distance maps were calculated.

  Regarding the factor of natural resources, we calculate the climate (geolocated as polygon) by means of the Poulter Index (Poulter, 1962). We utilised the following items:

    PCT = 18 * T + 0.167 * I - 0.2 * P + 320, where:
    P = Average precipitation for the analysed period 2010–2020
    T = Average temperature for the analysed period 2010–2020
    I = Cumulative insolation for the analysed period 2010–2020

  (iii) The variables Roads, Rivers and Routes were geolocated as lines from which distance buffers were generated.

b) **Second**, the calculation of each factor was done by summing the weighted variables of each factor. The resulting maps represent the tourism potential of six factors: Cultural attractions, Accessibility, Complementary offer, Ancillary services, Natural resources and Accommodation offer. The calculation of each factor was made by adding the weighted variables of each factor. The resulting maps represent the tourism potential of six factors that provide the **Representation of the tourism potential of each factor**, Fig. 4. Each of the six factors and the final sum (**S**) was assigned a weighting according to the criteria of the panel of experts (Table 4).

3.5. Instruments and measures. Identification of General Tourism Potential of Viticultural Areas

To analyse the tourism potential of wine-growing areas for wine tourism, a multi-criteria system has been applied (Maracajá et al., 2021; 2022). Weighting criteria are established for each of the 6 factors identified as important for determining the tourism potential (Table 4). The panel members were selected for their expertise in geography and tourism. The weighting of the variables and factors was carried out by a panel of 12 experts composed of academics from various national and international universities (the experts are mentioned in the Acknowledgements section). The experts are academics with expertise in the field of tourism, as well as geography and economics. The analyses to weight the variables were carried out through face-to-face and online meetings. The evaluations followed the research criteria set out in Radmila Jovanovic's thesis and discrepancies were resolved by mutual agreement, following dialogue between the participating experts.

The integration of the six factors allows generating the map that measures the **General Tourism Potential of the Viticultural Areas** (Fig. 5). To analyse the tourism potential of the viticultural areas for wine tourism, a multi-criteria system based on expert estimations has been applied. Weighting criteria are established for each of the 6 factors identified as important for determining the tourism potential (Table 4). The final score for wine tourism potential is calculated using the following formula:

$$SFinal = wCultural \cdot SCultural + wAccess \cdot SAccess + wSupp \cdot SSupp + wAnc \cdot SAnc + wNat \cdot SNat + wLodg \cdot SLodgS$$

3.6. Instruments and measures. Identification of the Tourism Potential of Vineyards and wineries

Based on the General Potential Tourism Viticultural Areas map, an overlay operation was carried out on the land use layer of vineyards (CORINE Land Cover) and the wineries identified using Google Street Map data, which made it possible to obtain maps of **Tourism Potential of Vineyards** (Fig. 6) and **Wine Tourism Potential of Wineries** (Fig. 7).

The scale is defined in the range of 1–9 for the reclassification of factors (Fig. 4) and tourism potential maps (Figs. 5–7). The data were standardised so that they could be represented according to the scale used. All maps use the same scale of representation from 1 to 9 (Table 5).

The non-standardised data for each of the three tourism potentials can be seen in the tables in Annex 2. These three tables of potentials are related to the maps in Figs. 5–7. This annex presents three numerical potential tables (Tables 8, 9 and 10), which present the scores for each of the ranges of the rating scale (1–9) (minimum to maximum). The minimum and maximum average scores are also shown. These tables have allowed comments and analysis of the distribution of tourism potentials.

4. Results

The **tourism factors** are shown below in six maps in Fig. 4. Each of the factors summarises the tourism variables identified in Table 4; Table 6 shows the spatial distribution by regions and subregions for the very high and very low values of each factor.

Cultural Resources (A) are especially located on the Istrian Peninsula, around Split (Dalmatia) and Zagreb. Cultural resources, such as

Table 4
Classification of tourism variables and weight by factors. Source: Authors.

| Cultural attractions	weight (w)	Accessibility	weight (w)	Supplem. offer	weight (w)	Ancillary services	weight (w)	Natural resources	weight (w)	Lodgem. supply	weight (w)
Church, Monastery	0.2	Road	0.4	Picnic	0.2	Market	0.2	View point	0.1	Hotel	0.25
Archeolog. sites	0.2	Railway	0.2			Shopping mall	0.2	Topography (slope, exposition)	0.1	Hostels	0.25
Castles	0.2	Airport	0.4	Restaur.	0.4	Tourism offices	0.2	Rivers	0.1	Camp Sites	0.25
Monument	0.2			Bars	0.4	Sport and recreational areas	0.2	Lakes	0.1	Motels	0.25
Museums	0.2					Tracks	0.2	Protected areas	0.3		
								Climate	0.3		
0.2 SCultural	1	0.2 SAccess	1	0.05 SSupp	1	0.05 SAnc	1	0.3 SNat	1	0.2 SLodg	1
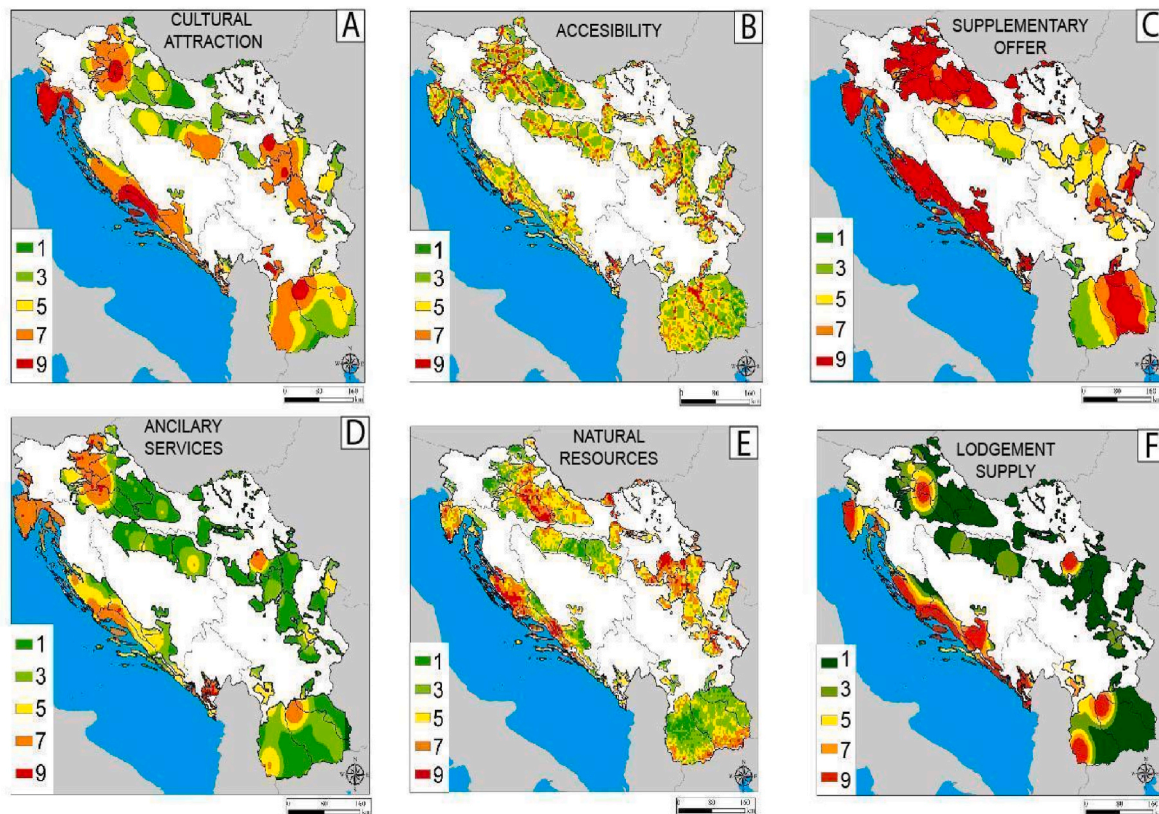
Fig. 4. Representation of the tourism potential of each factor. Source: Authors.

historic cities and monuments, are most significantly concentrated on the Istrian Peninsula, near Split (Dalmatia), and Zagreb. These areas and cities have a rich heritage that is very attractive to tourists. We have assigned the same value to each cultural variable (Table 4).

Accessibility (B) is crucial for attracting wine tourists, both for arrivals from abroad (which favours large cities due to the presence of airports) and for rural vineyard areas far from urban areas (roads). We have assigned a higher value on airports and roads (Table 4). The areas with the greatest potential for accessibility are located around the big cities, due to the availability of airports and motorways, and in the large inland valleys of the Danube and Sava. In addition, other types of tourism areas that are concentrated in areas with high accessibility, such as coastal and urban tourism, can be diverted towards wine tourism.

The Supplementary Tourism Offer (C) is concentrated in Istria, Dalmatia and the hinterland of Croatia and Slovenia, as well as the central part of North Macedonia. These regions offer a wide range of activities beyond the basic wine tourism experience, such as cultural events, nature tours and gastronomy. Established tourist areas and cities have a greater supply in the hospitality sector (bars and restaurants). Because of their direct connection to wine tourism, we have given more value to restaurants and bars.

Ancillary Services (D) complement and qualify wine tourism activities, either by providing offers that are sometimes used by wine tourism such as tracks, sports and recreational areas and tourist offices, or in other cases on a more ad hoc basis such as markets and shopping centres. These services show their greatest potential in the regions of Montenegro (Skadar lake) and secondarily in Istria, Central Dalmatia and around Zagreb. We have assigned the same value to each ancillary service variable.

Natural Resources (E) are of particular importance for the qualification of wine tourism, as this activity is closely linked to the appreciation of the natural environment. We have considered that the climate and protected natural areas are more important than the other variables

studied (rivers, lakes, viewpoints and the topography of the environmental or landscape scenery (Table 4). The areas with the greatest potential in natural resources are located in Dalmatia, around Zagreb along the Sava river valley, around the Danube and Morava in Serbia, and in the south of North Macedonia.

The A**ccommodation Supply** (F) is concentrated around the big cities, plus Istria, Dalmatia and Lake Ohrid in Macedonia. The supply of accommodation is concentrated in urban areas and established tourist areas. In order to be able to evaluate the tourism potential of other non-consolidated areas, especially in rural areas, and to be able to cover the different options for wine tourists, we include in the evaluation a wide range of accommodation (hotel, hostel, camping, motel), which are valued with equal weight (Table 4).

The highest concentration of tourism potential factors is found in the wine areas where the capital cities are located, such as Zagreb, Belgrade and larger regional centres, such as Niš, Split, Zadar, Rijeka (Croatian coast region), Skopje, (Istria Peninsula), and Skadar and Ohrid lakes (Table 6).

According to the results of the map **General Tourism Potential of Viticultural Areas**, which summarises the above six factors (Fig. 5), and the statistical data provided by Table 9 (Annex II), six areas of high potential can be identified, one of which is coastal and the rest are located in the hinterland of the study area.

a) On the coastal side, the main region is the entire Croatian coast (from Istria to Dalmatia) which has a significant tourism potential. The presence of the sea and the activity linked to it, combine positively with the identified tourism potential factors, so that it becomes the area with the highest potential in the study area. The Croatian coast, in addition to the Adriatic Sea, has a large number of national parks and historical and cultural monuments protected by UNESCO. These include the national parks of Brijuni, Paklenica, Plitvice Lakes, Kornati, Mljet, Risnjak and North
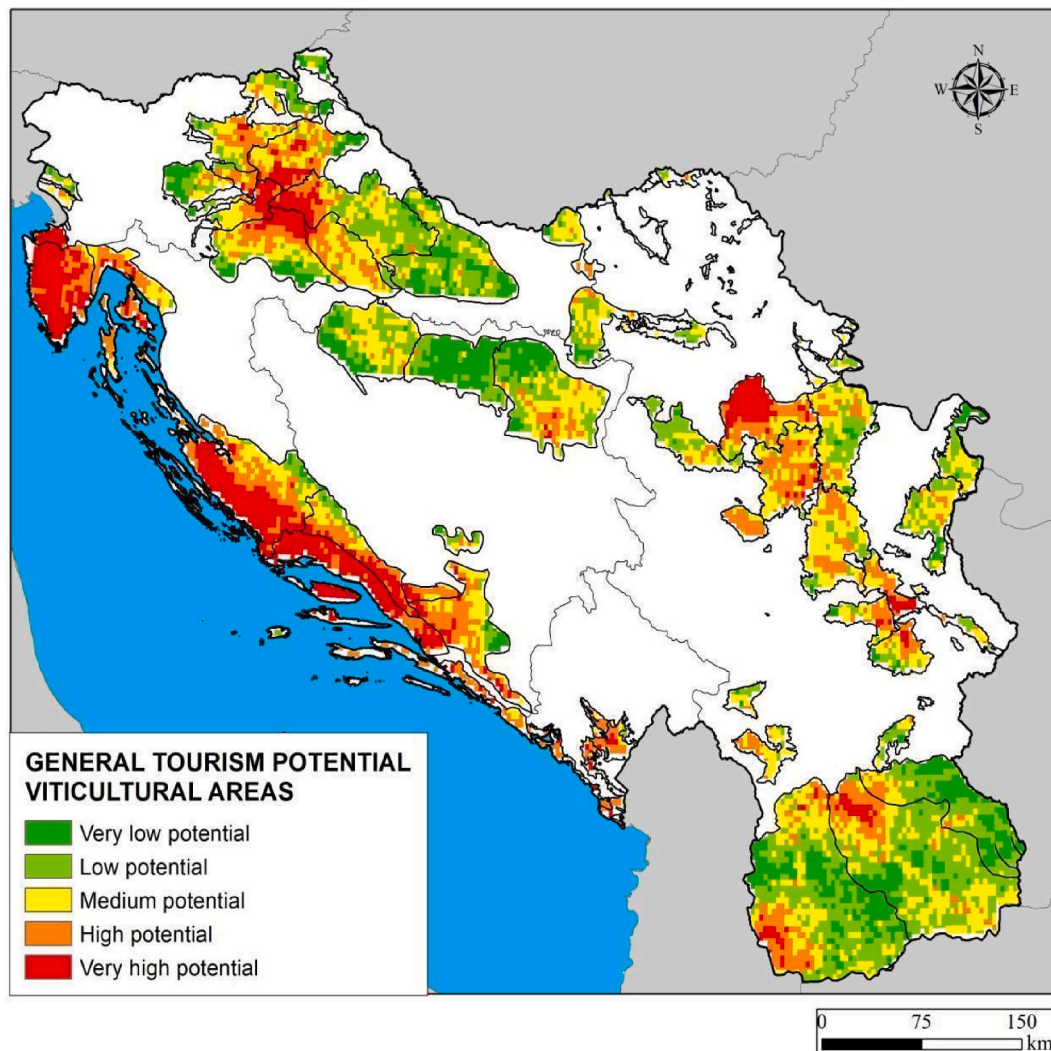
Fig. 5. General tourism potential of viticultural areas. Source: Authors.

Velebit. There are many UNESCO monuments: Diocletian's Palace in Split, the Euphrasian Basilica in Poreč, the Old Town of Dubrovnik, the Cathedral of Šibenik, the Venetian Fortress, etc.

b) The second area, smaller in terms of surface area, with a high tourism potential in the area near Lake Skadar (Montenegro). This covers the sub-regions of Crmnica, Rijeka and Podgorica. This area has extensive cultural and natural resources, good accessibility, as well as a remarkable number of wineries.

c) The Western Continental Croatia region is an area with high potential, due to its proximity to Zagreb, which provides it with numerous infrastructure, services, accessibility, cultural and natural resources, as well as proximity to extensive vineyards and wineries.

(d) Bordering the previous region are the Slovenian wine-growing regions of Podravka and Posavina. They have similar characteristics to the Western Croatian region, with good communications with Luibliana, although Zagreb is closer, natural and cultural resources and well-managed vineyard areas.

(e) Central Serbia (Belgrade and Niš). Around these two cities are identified two areas with a remarkable tourist potential, due to the ease of accessibility, natural and cultural resources, and a wide range of accommodation, in the case of Belgrade. The city of Belgrade has a rich heritage along with the proximity of natural parks (Avala and Kosmaj), as well as rivers and lakes.

f) Finally, two high potential areas in North Macedonia, one around Skopje, which is explained by similar reasons to the regions organised around cities, and another area around Lake Ohrid, which combines extensive natural conditions with cultural ones, thanks to the presence of numerous monasteries.

We show the results of the map of the **Wine Tourism Potential of the Vineyards** (Fig. 6). In this map we analyse the tourism potential of each vineyard production unit in relation to the previous information on tourism potential. According to this map, in the same way as in the general tourism potential map, two zones can be distinguished: coastal and inland. In the coastal part, coastal Croatia (from Istria to Dalmatia) stands out, with a very high potential for the development of wine tourism. On the mainland, the wine-growing area of Western Mainland Croatia, Belgrade and Povardarie (Northern Macedonia). Very low potential for the development of wine tourism is observed in the wine-growing subregions in Slovenia: Styria (Podravska region) and Dolenjska (Posavina region); in Croatia, the regions with the lowest potential are Slavonia and Croatian Danube Region (Eastern Continental Croatia), Prigorje-Bilogora and Pokuplje (Western Continental Croatia); in Bosnia and Herzegovina, we can highlight the subregion of Majevica, Kozarac and Ukrina (Northern Bosnia) (Table 10 in Annex 2 and Fig. 6).

In the map of **Wine Tourism Potential of Wineries** (Fig. 7), we analyse the tourism potential of each winery in relation to the previous information on tourism potential. The results of the map show a change
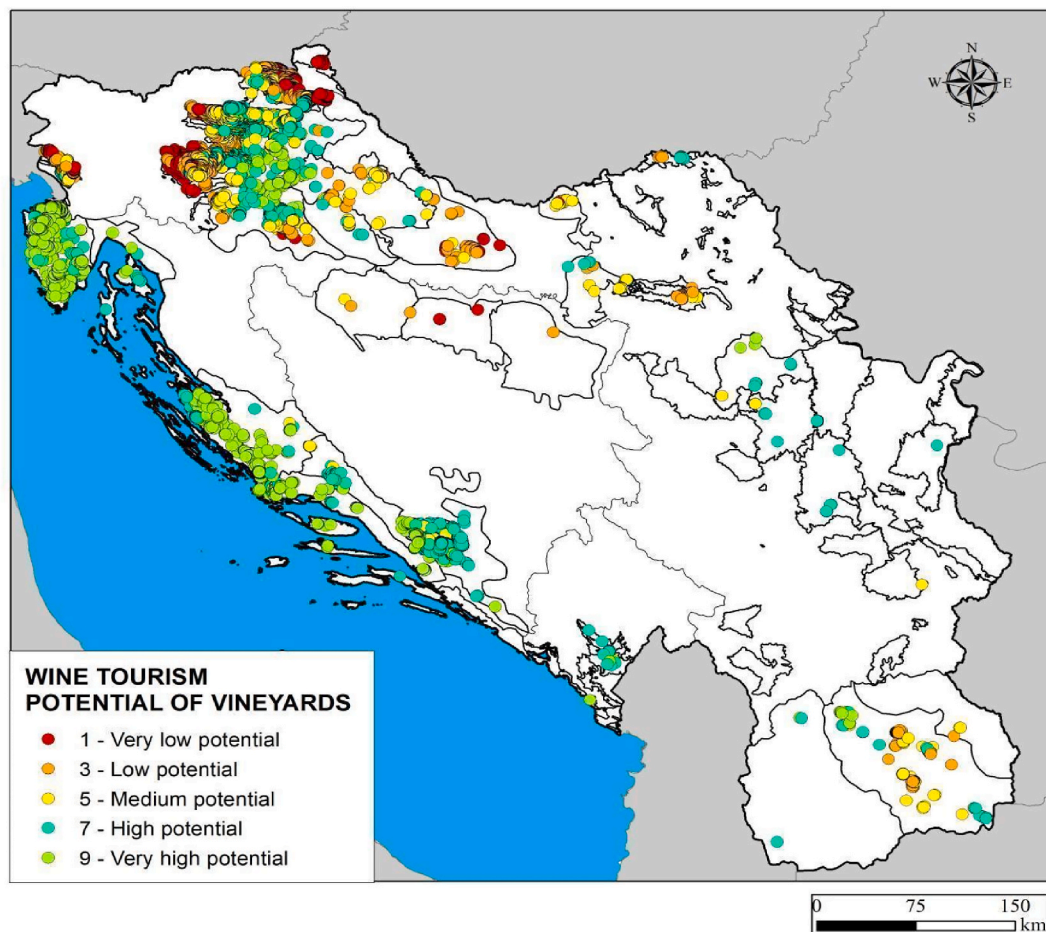
Fig. 6. Tourism potential of vineyards. Source: Authors.

of the areas with potential, compared to the previous map (Fig. 6). Two zones stand out here: the coastal zone, with a clearly dominant wine tourism very high potential in coastal Croatia (from Istria to Split). The second area is inland with a particularly low density of wineries. In spite of the low level of this zone, there are areas with high potential in Belgrade and the northern part of Povadarje (Skopje, North Macedonia). Zones with very low and low potential are located in Slavonia (Eastern Continental Croatia), and the southern part of the Povadarje region and Pchinya-Osogovo (Northern Macedonia). Wineries with very high wine tourism potential are located in the Pelagonia-Polog region (Northern Macedonia) with a total of 22 wineries with high potential, then the Belgrade subregion with 18 wineries, and the Coastal Croatia (Croatian Istria and the Croatian Coast) region with 21 wineries (Table 11 in Annex 2 and Fig. 7).

5. Discussion

The results indicate that there are countries and regions in the former Yugoslavia that have a remarkable potential for wine tourism and other regions and countries that need considerable support to develop these areas as wine tourism destinations. For both advantaged and developing areas, it may be interesting to take into account what has been done by leading European wine tourism destinations, such as France, Italy and Spain (Gómez et al., 2019).

One aspect that managers in these countries have identified as important is the creation of Protected Designations of Origin for wines, in such a way that these bodies increase the quality of the wines and create brands that help the distribution of the wines and consolidate the regions as wine tourism destinations (Barjolle et al., 1997; Gómez &

Molina, 2012). Brands generate product and regional recognition, as well as loyalty and attachment among wine tourists, travellers and wine customers (Orth et al., 2012). The importance of protected designations of origin (PDOs) in these countries is so significant that these three countries account for 53.7% of the PDOs in the European Union (880). In addition, these three countries have 239 Protected Geographical Indications (PGI) for wine areas and 106 Geographical Indications for spirits and 813 PDO and PGI food products. In all these cases, these countries represent a very significant part of the quality brands in the European Union and support the image and attractiveness of wine tourism destinations (European Commission, 2024 and Table 6.

Croatia has 19 wine PDOs and Slovenia has 10 wine PDOs and 3 PGIs. Although in absolute terms the number of protection marks for food production, wine and spirits is small compared to these three countries, in relative terms, measured per square kilometre, the situation of these two republics is relatively good (European Commission, 2024 and Table 7). No reliable comparative data are available for the rest of the Yugoslav republics; the absence of structured data shows that the situation is much improved.

One aspect widely studied in these three countries is the profile of wine tourists and their motivations for choosing this tourism product and information channels (Asero & Patti, 2011), as well as the expectations of winery managers (Aschaters & Menival, 2011).

Another aspect that has been developed extensively in the three countries mentioned above is the development of festivals and events to promote wine and wine tourism destinations (Bitsani & Kavoura, 2012). This promotion has been accompanied by measures to enhance the wine tourism experience. Other actions have been aimed at increasing the number of wine routes (López-Guzmán et al., 2009), the combination
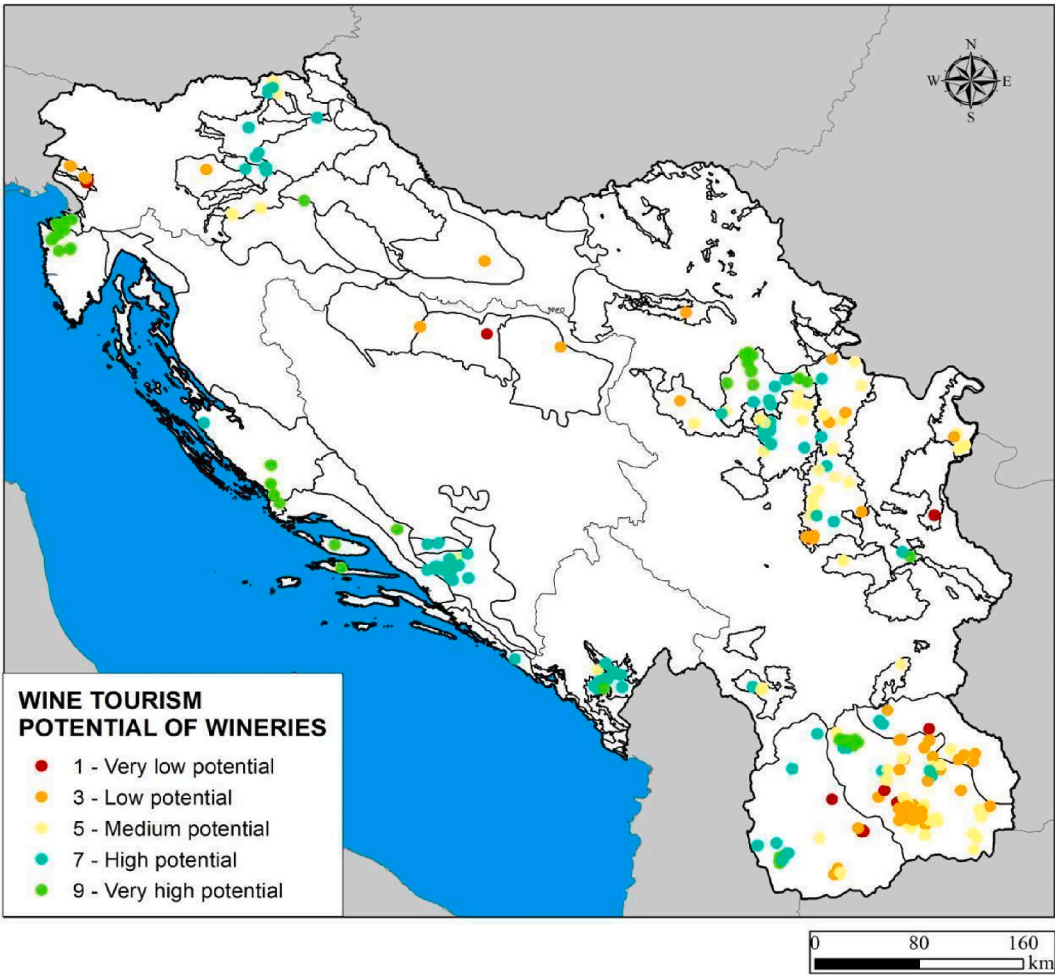
Fig. 7. Wine tourism potential of wineries. Source: Authors.

Table 5

Scale of final values of wine tourism potentials. Source: Authors.

Value	Interpretation of factor value/score
1	Tourist potential/element of neutral importance – Very low potential
3	Tourist potential/element of slightly greater importance - Low potential
5	Tourist potential/element of pronounced importance - Medium potential
7	Tourist potential/element of dominantly high importance - High potential
9	Tourist potential/element of absolute importance - Very high potential

with other nearby tourism products such as gastronomy (Alonso & Liu, 2011) and improving the image of specialised wine tourism destinations (Gómez & Molina, 2012).

Reflecting on the results of our study's analysis of wine tourism potential, we note that the six identified tourism factors (Fig. 4) manifest themselves in a regionally differentiated manner. For example, the coastal part of Croatia, including Istria and Dalmatia, shows high tourism potential due to a combination of natural resources (such as the coast and natural areas), cultural resources, and developed infrastructure. These results align with Thach & Charters (2018), who stress the importance of complementary tourism offers for the development of wine tourism.

On the other hand, continental regions such as Prigorje-Bilogora, Plešivica, and Pokuplje, as well as the wine region around Belgrade, exhibit significant potential due to specific wine characteristics, accessibility, and natural resources. These regions fit into the pattern identified by Hall et al. (2009), where accessibility and natural resources play a key role in attracting wine tourists. Additionally, the presence of

ancillary services and accommodation near wine regions confirms Martínez-Falcó et al. (2023) findings on the importance of integrating cultural and tourist resources for the overall wine tourism experience.

Ancillary services, including restaurants and tourist services, show the highest potential in the wine regions of Montenegro, with Istria, Central Dalmatia, and Zagreb being secondary centres. These services contribute to the quality of wine tourism by enhancing the overall tourist experience (Rodríguez-García et al., 2010). Given the current development, these regions have become leaders in providing additional services, increasing the overall attractiveness of wine tourism compared to other areas.

Natural resources and sustainability are crucial for the development of wine tourism (Ajuhari et al., 2023; Taylor et al., 2010). Regions with favourable climatic conditions and exceptional landscapes, such as Dalmatia, the area around Zagreb, and northern parts of North Macedonia, offer ideal conditions for viticultural activities. In the current context, these regions stand out due to their ability to support high-quality viticultural activities and wine tourism.

The wine tourist is quite sensitive to tourist accommodation, its quality and link with historical and cultural aspects, both with the local community and the wine production process, especially the historical wine cellars (Brochado et al., 2020). The accommodation offer is highly concentrated in the main cities, as well as in Istria, Dalmatia and around Lake Ohrid in Macedonia. These areas offer a variety of accommodation options that are key to the successful development of wine tourism. These regions show a steady growth in the quality and quantity of accommodation capacity, which contributes to an increase in the number of tourists. These areas follow the footsteps of other regions that have

Table 6

Spatial distribution of tourism potential factors. Source: Authors.

	Very high potential	Very low potential
Cultural resources	Istria, Dalmatia, Zagreb (Croatia) and Belgrade	Podravka region (Slovenia), Eastern continental of Croatia, South of Povardarie
Accessibility	Rijeka, Zagreb, Belgrade, Skopje	Eastern continental of Croatia, Pelagonia-Polog (North Macedonia)
Supplementary tourism offer	Istria, Dalmatia and inland Croatia and Slovenia, Povardarie (Macedonia), Lake Skadar (Montenegro), Knjaževac and Negotin (East Serbia)	Pchinya-Osogovo (East of North Macedonia)
Ancillary services	Primorska region (coast of Slovenia), Istria and Split (Croatia), Lake Skadar (Montenegro), Belgrade and Skopje	Western and Eastern continental of Croatia, Bosnian regions, Vojvodina, central Serbia except Belgrade, South and East of North Macedonia
Natural resources	Dalmatia, Istria, Moslavina, Prigorje and Zagorje (Croatia), Belgrade, Leskovac and Mlava (Serbia) South of North Macedonia	Podravka and Posavina regions (Slovenia), Northern Bosnia, Herzegovina and most of North Macedonia
Lodgement supply	Istria, Dalmatia, Zagreb, Belgrade, Lake Skadar (Montenegro), Lake Ohrid (North Macedonia) and Skopje	Podravka region (Slovenia), Eastern continental of Croatia, Northern Bosnia, Central Serbia except Belgrade, Pelagonia-Polog, Povardarie except Skopje (Macedonia)

positioned themselves as outstanding wine tourism destinations, such as France, Italy and Spain (Hall et al., 2009).

The areas showing a high potential for wine tourism coincide with the surroundings of the main cities and the coast, as these areas have been favoured by their good accessibility conditions, infrastructures and cultural attractions. On the other hand, the areas farther away from urban areas or the coast are those with the lowest potential. The fact that the areas with the main potential are located near urban areas or the coast can be a positive element, since they have a nearby outbound market that can favour the arrival of visitors interested in wine tourism. However, the low-potential areas located farther away from urban centres or the coast will have great difficulties to develop as wine tourism destinations. Areas with less potential should differentiate themselves from established wine tourism areas by enhancing the value of unique experiences, relevant heritage and natural areas (Alonso & Kok, 2020).

The Yugoslav economy experienced remarkable economic growth during much of Tito's rule. Although Tito's rule was inspired by communist principles, there was less centralism and economic dogmatism. During the 1980s, numerous economic problems were observed, with a high external debt (Hall, 1991, p. 321). Internally, there was an intensification of the internal economic gap between the prosperous north (Slovenia and Croatia) and the southern regions, especially

Bosnia, Montenegro and Kosovo (Our World in Data, 2024). The wars that broke out in the 1990s had a very negative impact on the economy of the republics, especially Bosnia, Serbia, Croatia and Kosovo. The entry into the European Union and the euro has increased the economic gap between Slovenia and Croatia and the rest of the republics. These differences are more evident in the rural areas of the republics.

6. Conclusions

Wine tourism could become one of the main and stable financial factors in the viticultural regions of the former Yugoslavia. In these areas, unique grape varieties and wines can be distinguished, with favourable geographical conditions and locations, good terrain characteristics, diverse flora and fauna, gastronomy, and rich cultural and historical heritage. The development of viticulture in the former Yugoslavia has a long tradition. However, wine production from the Second World War to the present has undergone great variation: during the communist period, mass (industrial) production without high quality was promoted, and during the capitalist period, quality wine production in small private farms was promoted.

The influences of global processes, emigration, and the depopulation of villages in the former Yugoslavia compel rural areas to seek alternative sources of development financing. This highlights the greatest value of proposals that direct the economy of rural areas towards diversification. Tourism, primarily rural tourism, is one of the alternatives. However, this does not mean that every village should or can develop tourism, but rather that based on available potentials (attractions), workforce, location, and infrastructure, those areas with the greatest prospects should be identified. In this context, some rural settlements recognize wine tourism as a development opportunity. Therefore, it is necessary to develop a commercial strategy for wine tourism, market-oriented, including wineries and the population dependent on wine-making and viticulture, as well as all those stakeholders who can contribute to creating an offer in line with the desires and expectations of potential tourists.

The evolution of the different states of the former Yugoslavia has been very differentiated. Some states have had an evident development in wine tourism, such as Croatia and Slovenia, while the rest of the states have experienced less growth. Likewise, in the cases of Croatia and Slovenia, there has been a clear reduction in wine production, due to the regulatory and production demands of the European Union. Moreover, in these two countries, wine tourism has allowed the maintenance of family farms (Jurinčič & Bojnec, 2009). It is these two cases that have the greatest potential for growth in the area of wine tourism. Serbia has also seen a sharp reduction in vineyard area, but in this case it has been more affected by the internal economic problems following the Yugoslav wars.

On the other hand, certain areas of North Macedonia and Serbia that have significant tourism potential for wine tourism, according to our study, will be remarkably successful in the near future, provided that there is a minimum of government support and involvement of entrepreneurs. These areas only need to follow the guidelines that have been developed by the wine regions of neighbouring countries: Hungary,

Table 7

Geographical indications for the protection of foods, wines and spirit drinks.

	Spain (No.)	Spain (Km2 country/No.)	France (No.)	France (Km2 country/No.)	Italy (No.)	Italy (Km2 country/No.)	Croatia (No.)	Croatia (Km2 country/No.)	Slovenia (No.)	Slovenia (Km2 country/No.)
Food DOP & PGI	218	2321.2	273	2020.9	324	932.3	50	1131.9	25	810.9
Wine PDO	104	4865.7	366	1507.4	410	736.8	19	2978.6	10	2027.3
Wine PGI	43	11,768.1	76	7259.1	120	2517.3	0	0.0	3	6757.7
Spirit Drinks GI	19	26,633.2	53	10,409.3	35	8630.7	6	9432.3	4	5068.3

Source: European Commission, 2024 and authors

Romania and Greece.

Practical implications. Wine tourism in the countries of Yugoslavia shows a significant difference between the countries integrated in the EU (Slovenia and Croatia) and the rest. There is also a notable difference in the development of wine tourism between coastal areas and inland areas. The Yugoslavian coastal area shows a clear tourism advantage, as it combines the tourism resources of the coastline with the development of the wine tourism offer.

i) Croatia and Slovenia show a notable development of the wine tourism offer, but the quality of the offer still needs to be improved, since it is overshadowed by the more consolidated tourist products such as coastal, nature and urban tourism. For a more adequate development of wine tourism in these two countries, an improvement in promotion and connection with other products such as gastronomy is needed. The promotion of wine tourism should be supported by the development of recognisable wine brands, as well as the development of unique accommodation, especially in wineries and the development of experiential tourism products, suitable for the demanding segments of the wine tourism traveller. he development of wine festivals and events is essential, as is the segmentation of demand (Alebaki & Iakovidou, 2010)

ii) In an intermediate position are Serbia and North Macedonia. Serbia has areas with high wine tourism potential in the Central Region, especially in the area around Belgrade. The wine-making tradition, the presence of numerous wineries and cultural resources are opportunities for the consolidation of wine tourism. To consolidate this product, it is necessary to create wine routes, with clear support in promoting them. Likewise, it is necessary to improve the quality of rural accommodation and the training of human resources. North Macedonia stands out for the important wine production within the countries studied. It has two areas with great wine tourism potential, the north of the Vardar River valley, close to Skopje and the area around Lake Ohrid. The lack of international awareness of wines is a handicap, as wine tourism needs to consolidate wine brands and wine designations of origin (Peris-Ortiz et al., 2016), along with increasing the quality of accommodation and the consolidation of wine routes.

iii) Montenegro, Bosnia and Herzegovina and Kosovo show the lowest level of wine tourism potential and development. Montenegro and Bosnia show certain areas of wine tourism potential: Lake Scutari (Montenegro) and southern Bosnia. All three republics need considerable investment in basic infrastructures: reception of visitors, accommodation, creation of routes, marketing of tourism packages and improvement of human capital, and increase in the quality of wine production.

Some general measures for destination and wine tourism product managers are also proposed.

(i) Providing substantial support to wineries and grape cultivation through financial support, modernization of wineries, incentives for improving native grape varieties.

(ii) Development in infrastructure, information centres, and accommodation facilities in close proximity to wineries is essential.

(iii) Emphasizing education and training programs for the local population on the wine industry. People in rural areas have no specific training in tourism management.

(iv) Also, is necessary a marketing campaign focused on promoting wine tourism through social media and consolidate the wineries' brands together with the destination marketing organizations.

(v) It is vital to focus on networking and collaboration among wineries, tourism agencies, local authorities, and educational institutions.

Wine tourism can bring several regional benefits, such as diversification of the tourism offer and job creation in areas in economic and demographic crisis. Wine tourism is one of the limited options available to the areas analysed to maintain vine cultivation in the agricultural areas analysed. Wine tourism attracts a segment of travellers with high purchasing power that is economically very profitable and compatible with the maintenance of agricultural activity (Charters and Menival, 2011). Finally, wine tourism allows visitors to learn about local culture, traditions and gastronomy, thus preserving the cultural heritage of rural regions, which would otherwise disappear.

Theoretical implications. This research proposes a specific model for assessing the potential of wine-growing areas for the development of wine tourism. The method developed in this study represents a significant contribution to the evaluation that integrates various aspects of wine tourism, including geographical, economic, cultural, and infrastructural factors. This model can be further used to create strategic plans and policies that support the development of wine tourism. Companies in the wine industry can utilise these insights to identify market opportunities and optimise their offerings. Destination agents, such as tourist organizations and local communities, can use the data to promote and develop tourism products that attract visitors. We hope that this methodology will be refined and applied to other countries.

Limitations. The use of open data may have some limitations with regard to verification and maintenance. Although the research team has verified and improved the databases, there is no agency to verify these data. It is possible that some data on tourism resources, vineyard cultivation areas or wineries may not be included in the open database. An example is the sub-region of Srem (Fruška Gora), which despite having numerous wineries and cultural resources, these are not detailed in the open geodata, probably due to the lack of promotion of these wineries. Furthermore, the quantitative and cartographic analysis could be completed with interviews with public and private managers, in order to better interpret the results obtained.

CRediT authorship contribution statement

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Fernando Almeida-García is an Associate Editor for *[Plos One and International Journal of Tourism Policy]* and was not involved in the editorial review or the decision to publish this article.

Acknowledgments

Annex 1.

Table 8
Localization and codes of analysed regions and subregions

1	Prekmurje	(SVN)	31	Budva-Bar	(MNE)
2	Styrian Slovenia	(SVN)	32	Ulcinj	(MNE)
3	Bizeljsko Sremič	(SVN)	33	Adriatic hinterland	(MNE)
4	Dolenjska	(SVN)	34	Boka Kotorska	(MNE)
5	Bela Krajina	(SVN)	35	Subotica	(SRB)
6	Slovenian Istria	(SVN)	36	Teleč	(SRB)
7	Kras	(SVN)	37	Potisje	(SRB)
8	Vapava valley	(SVN)	38	Srem	(SRB)
9	Croatian Danube Region	(CRO)	39	Banat	(SRB)
10	Slavonija	(CRO)	40	Southern Banat	(SRB)
11	Moslavina	(CRO)	41	Bačka	(SRB)
12	Prigorje – Bilogora	(CRO)	42	Belgrade	(SRB)
13	Plešivica	(CRO)	43	Čačak-Kraljevo	(SRB)
14	Pokuplje	(CRO)	44	Knjaževac	(SRB)
15	Zagorje-Međumurje	(CRO)	45	Leskovac	(SRB)
16	Croatian Istria	(CRO)	46	Mlava	(SRB)
17	Croatian coast	(CRO)	47	Negotin	(SRB)
18	Kozarac	(BIH)	48	Niš	(SRB)
19	Majevica	(BIH)	49	Nišava	(SRB)
20	Ukrina	(BIH)	50	Pocerina-Valjevo	(SRB)
21	Jablanica	(BIH)	51	Toplica	(SRB)
22	Mostar	(BIH)	52	Šumadija	(SRB)
23	Široki Brijeg	(BIH)	53	Three Morava's Subregion	(SRB)
24	Kuči	(MNE)	54	Vranje	(SRB)
25	Crmnica	(MNE)	55	Northern Metohija	(SRB)
26	Rijeka	(MNE)	56	Southern Metohija	(SRB)
27	Piperi	(MNE)	57	Povardarie	(MKD)
28	Katuni	(MNE)	58	Pchinya-Osogovo	(MKD)
29	Bjelopalvići	(MNE)	59	Pelagonia-Polog	(MKD)
30	Podgorica	(MNE)			

Note: SVN = Slovenia; CRO = Croatia; BIH = Bosnia & Herzegovina; MNE = Montenegro; SRB = Serbia; MKD = Macedonia KSV = Kosovo.

Annex 2.

Table 9
Vineyard areas and their Tourism Potential (1–9) in regions and subregions

Country	Region	No.	Area (km²)							
			Value	1	3	5	7	9	(7 + 9)	(1 + 3)
			Subregion							
SLOVENIA	Podravka	1	Prekmurje	1.0						1.0
		2	Styrian Slovenia	9.0	20.5	27.0	24.5	2.0	26.5	29.5
	Posavina	3	Bizeljsko Sremic		2.5	3.0	8.5	1.0	9.5	2.5
		4	Dolenjska	15.0	10.0	6.0	4.0		4.0	25.0
		5	Bela Krajina	0.5						0.5
	Primorska	6	Slovenska Istra				0.5	7.5	8.0	
		7	Kras			1.0	1.0		1.0	
		8	Vipava valley	1.0	3.0	1.0				4.0
CROATIA	Eastern Cont. Croatia	9	Danube Region	1.0	3.2	4.5	0.9		0.9	4.2
		10	Slavonija	6.4	10.9	4.3	0.4		0.4	17.3
	Western Continental Croatia	11	Moslavina		1.3	5.6	4.5	0.4	4.9	1.3
		12	Prigorje – Bilogora	1.4	9.8	6.7	3.2	3.2	6.4	11.2
		13	Plešivica		0.3	1.6	1.2	1.7	2.9	0.3
		14	Pokuplje	2.0	2.4	4.9	4.2	3.9	8.1	4.5
		15	Zagorje – Međumurje	1.2	0.7	4.3	5.1	2.8	7.9	1.9
	Coastal Croatia	16	Croatian Istria			0.2	3.5	10.5	14.0	
		17	Croatian coast	0.7	3.0	8.4	18.1	25.6	**43.8**	3.8
BOSNIA AND HERZEGOV.	Northern Bosnia	18	Kozarac	2.2	4.1	4.1	0.4		0.4	6.3
		19	Majevica	3.5	4.6	5.2	2.2	0.2	2.3	8.1
		20	Ukrina	5.7	2.1	0.2	5.0		5.0	7.7
	Herzegovina	21	Jablanica	0.2	0.4	0.1	5.0		5.0	0.6
		22	Mostar	0.5	0.6	2.7	4.2	1.0	5.2	1.1
		23	Široki Brijeg			0.2	0.8	0.3	1.1	0.0
MONTENEGRO	Montenegro Lake Skadar Region	24	Kuči	1.2						1.2

Table 9 (*continued*)

Country	Region	No.	Area (km²)	1	3	5	7	9	(7 + 9)	(1 + 3)
			Value							
			Subregion							
		25	Crmnica	0.6						0.6
		26	Rijeka			0.6	2.9	0.6	3.5	
		27	Piperi	0.6						0.6
		28	Katuni			0.6	0.6		0.6	
		29	Bjelopalvići		1.7					1.7
		30	Podgorica		0.6	2.3	7.6	2.3	9.9	0.6
	Montenegro Coast Region	31	Budva-Bar				1.2	0.6	1.7	
		32	Ulcinj	0.6	1.7					2.3
		33	Adriatic hinterland	1.2						1.2
		34	Boka Kotorska				2.3		2.3	
SERBIA	Vojvodina	35	Subotica		0.3		0.2		0.2	0.3
		36	Teleč	0.3						0.3
		37	Potisje	0.3						0.3
		38	Srem		1.0	0.9				1.0
		39	Banat		0.2					0.2
		40	Južni Banat		0.9	0.3				0.9
		41	Bačka		0.3					0.3
		42	Beograd		1.0	5.0	9.5	13.8	**23.3**	1.0
	Central Serbia	43	Čačak-Kraljevo		0.3	0.7	3.6		3.6	0.3
		44	Knjaževac	1.4	6.2	7.4	1.6		1.6	7.6
		45	Leskovac	1.2	0.3	4.3	2.9	1.2	4.1	1.6
		46	Mlava	1.7	7.4	13.4				9.1
		47	Negotin	1.6	4.5	4.5	0.2		0.2	6.0
		48	Niš		0.5	1.9	3.4	1.6	5.0	0.5
		49	Nišava		0.9	0.7				0.9
		50	Pocerina-Valjevo	0.5	7.9	4.7	1.6		1.6	8.4
		51	Toplica	0.3	0.5	2.8	2.9	0.5	3.4	0.9
		52	Šumadija		1.0	11.2	13.6	1.6	**15.2**	1.0
		53	Three Morava's	0.3	4.0	16.4	9.0		9.0	4.3
		54	Vranje	0.5	1.7	1.0	0.2		0.2	2.2
	Kosovo and Metohija	55	Northern Metohija	1.7	4.2	5.0				5.8
		56	Southern Metohija			15.8	5.8		5.8	
NORTHERN MACEDONIA		57	Povardarie	13.2	48.8	31.5	14.8	3.8	**18.7**	62.0
		58	Pelagonija-Polog	1.1						1.1
		59	Pchinya-Osogovo	1.1	4.9	7.5	4.6	2.9	7.5	6.0
TOTAL				**80.4**	**180.6**	**229.6**	**185.6**	**88.9**	**274.4**	**261.0**

Table 10
Number of vineyards and their Tourism Potential (1–9) in regions and subregions

Country	Region	No	Potential Value	1	3	5	7	9	Mean (7–9)	Mean (1–3)
			Subregion							
SLOVENIA	Podravka	1	Prekmurje	64						32
		2	Styrian Slovenia	684	2761	3590	4311	308	**2309.5**	**172.5**
	Posavina	3	Bizeljsko Sremic		47	649	1763	83	**923**	23.5
		4	Dolenjska	1039	1250	1204	447		**223.5**	**1144.5**
		5	Bela Krajina		1	482				0.5
	Primorska	6	Slovenian Istria				153	3943	**2048**	
		7	Kras		39	204	162		81	19.5
		8	Vipava valley	398	756	392				**577**
CROATIA	Eastern Continental Croatia	9	Danube Region	2	8	23	115		57.5	5
		10	Slavonija		147	16	2		1	73.5
	Western Continental Croatia	11	Moslavina		58	77	39		19.5	29
		12	Prigorje – Bilogora		49	131	51	97	74	24.5
		13	Plešivica			283	281	43	162	
		14	Pokuplje	2	42	505	821	85	453	22
		15	Zagorje–Međumur.	509	96	270	435	138	**286.5**	**302.5**
	Costal Croatia	16	Croatian Istria				78	1293	**685.5**	
		17	Croatian coast		1	19	278	831	**554.5**	0.5
BOSNIA AND HERZEGOVINA	Northern Bosnia	18	Kozarac		1	1				0.5
		19	Majevica	1	1					1
		20	Ukrina	10						5
	Herzegovina	21	Jablanica							
		22	Mostar			84	947	96	**521.5**	
		23	Široki Brijeg		9	148	38		93	
MONTENEGRO	Montenegro Lake Skadar Region	24	Kuči							
		25	Crmnica							

Table 10 (*continued*)

Country	Region	No	Potential Value Subregion	1	3	5	7	9	Mean (7–9)	Mean (1–3)
		26	Rijeka							
		27	Piperi							
		28	Katuni							
		29	Bjelopalvići				2			
		30	Podgorica			1				
	Montenegro Coast Region	31	Budva-Bar					1	0.5	
		32	Ulcinj							
		33	Adriatic hinterland			1	15	1		
		34	Boka Kotorska							
SERBIA	Vojvodina	35	Subotica			3	29		14,5	
		36	Teleč							
		37	Potisje							
		38	Srem		117	50				58.5
		39	Banat							
		40	Južni Banat							
		41	Bačka							
		42	Beograd			1	5	3	4	
	Central Serbia	43	Čačak-Kraljevo							
		44	Knjaževac				1		0,5	
		45	Leskovac			2				
		46	Mlava				18			
		47	Negotin							
		48	Niš							
		49	Nišava							
		50	Pocerina-Valjevo							
		51	Toplica							
		52	Šumadija			5	6		3	
		53	Three Morava's				2		1	
		54	Vranje							
	KOSOVO AND METOHIJA	55	Northern Metohija							
		56	Southern Metohija							
NORTHERN MACEDONIA		57	Povardarie		80	48	86	9	47.5	40
		58	Pelagonija-Polog		1	5				0.5
		59	Pchinya-Osogovo				4	1	2.5	0

Table 11
Number of wineries and their Tourism Potential in the regions and subregions

Country	Region	No	Potential Value Subregion	1	3	5	7	9	Mean (7–9)	Mean (1–3)
SLOVENIA	Podravka	1	Prekmurje							
		2	Styrian Slovenia			2	5		2.5	
	Posavina	3	Bizeljsko Sremic				4		2	
		4	Dolenjska		1					0.5
		5	Bela Krajina			2				
	Primorska	6	Slovenian Istria					4	2	
		7	Kras							
		8	Vipava valley	6	4					5
CROATIA	Eastern Continental Croatia	9	Croatian Danube Region							
		10	Slavonija		1					0.5
	Western Continental Croatia	11	Moslavina							
		12	Prigorje – Bilogora							
		13	Plešivica			2				
		14	Pokuplje					1	0.5	
		15	Zagorje–Međumur.				2		1	
	Costal Croatia	16	Croatian Istria					10	5	
		17	Croatian coast				3	9	**6**	
BOSNIA AND HERZEGOVINA	Northern Bosnia	18	Kozarac							
		19	Majevica		1					0.5
		20	Ukrina	1	1					1
	Herzegovina	21	Jablanica							
		22	Mostar			1	20		**10**	
		23	Široki Brijeg				3		1.5	
MONTENEGRO	Montenegro Lake Skadar Region	24	Kuči							
		25	Crmnica							
		26	Rijeka				4		2	

Table 11 (*continued*)

Country	Region	No	Potential Value	1	3	5	7	9	Mean (7–9)	Mean (1–3)
			Subregion							
		27	Piperi							
		28	Katuni			1				
		29	Bjelopalvići				1		0.5	
		30	Podgorica				10	1	**5.5**	
	Montenegro Coast Region	31	Budva-Bar							
		32	Ulcinj							
		33	Adriatic hinterland							
		34	Boka Kotorska							
SERBIA	Vojvodina	35	Subotica							
		36	Teleč							
		37	Potisje							
		38	Srem		1					0.5
		39	Banat							
		40	Južni Banat							
		41	Bačka							
		42	Beograd			3	7	11	**9**	
	Central Serbia	43	Čačak-Kraljevo							
		44	Knjaževac	2						1
		45	Leskovac							
		46	Mlava		3	4	2		1	1.5
		47	Negotin		1	3				0.5
		48	Niš				1	1	1	
		49	Nišava							
		50	Pocerina-Valjevo		1	1				0.5
		51	Toplica			1			0	
		52	Šumadija			8	15		**7.5**	
		53	Three Morava's	2	13	10	3		1.5	**7.5**
		54	Vranje			1				
	KOSOVO AND METOHIJA	55	Northern Metohija							
		56	Southern Metohija			5	1		0.5	0
NORTHERN MACEDONIA		57	Povardarie	2	142	66	8	14	**11**	**72**
		58	Pelagonija-Polog	1	5	4	3		1.5	3
		59	Pchinya-Osogovo	5	3	4	9	8	8.5	4

Data availability

Data will be made available on request.

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