

THE WINE MARKET IN POLAND AND THE MAIN DETERMINANTS OF ITS DEVELOPMENT – SELECTED ASPECTS

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Purpose: The aim of this study was to assess the changes that occurred in grape production and the wine market in Poland in the years 2009-2021. In addition, an attempt was made to assess the impact of thermal conditions on the development of grape cultivation in Poland.

Design/methodology/approach: Changes in the number of vineyards, grape cultivation areas, grape harvests and the production and sale of wine in Poland were analysed in detail. The analysis was conducted based on data from the National Support Centre for Agriculture (KOWR) and the Institute of Meteorology and Water Management (IMiGW).

Findings: The research indicated that grape cultivation and wine production developed dynamically throughout the period in question. It is worth noting that most of the observed changes took place in the form of an exponential trend, which also points out the level of interest shown among producers and consumers in this industry and its potential. The study also showed that the distribution of vineyards registered at KOWR relative to the thermal conditions in a given region is relatively proportional across voivodeships (provinces). The voivodeships in which, based on the average sum of active temperatures from 2009-2021, relatively conducive conditions for the development of grape cultivation existed were also indicated.

Research limitations/implications: The research period covered only 11 years, this type of research requires further analysis to determine in the long-term further possibilities for the development of wine production in Poland.

Keywords: wine market, vineyards, climate changes, grapes.

Category of the paper: research paper.

1. Introduction

Although Poland is not strongly associated with viticulture in Europe and around the world, its tradition of wine production extends over 1000 years. The first wine region in Poland at that time was found in the area of Kraków, where grapes had been cultivated in the tenth century. Artefacts found on the slopes of Wawel Hill bear witness to this fact. The intensification of viticulture was connected with the spread of Christianity and the use of wine for liturgical purposes (Radziewicz, 2019). Monks and priests established the first vineyards in the twelfth century in the areas of Gniezno, Poznań, Wrocław and several other episcopal towns. The most prosperous grape cultivation period in the history of our country occurred in the fifteenth and sixteenth centuries. The vineyards of that time were very extensive, and wine produced in them enjoyed such great popularity that it was exported abroad (Kaplan, Suszyna, 2015). Production flourished to such an extent that ordinary settlers began to plant their own vineyards, thanks to which grape cultivation spread throughout the country (Estreicher, 2004). Interestingly, the names of many newly-established settlements were inspired by the word “wine”. Cities such as Winiary, Winnica, Winniki and many others serve as examples (Jaros, 2015). In the seventeenth and eighteenth centuries, there was a so-called “ice age”, during which a significant cooling of the climate occurred, contributing to a decline in grape production throughout the Republic at that time (Kaplan, Suszyna, 2015). Moreover, the economic crisis caused by the wars and policies pursued at the time only exasperated the problem experienced by winemakers (Yiou et al., 2012). Wine production was also out of the question in nineteenth-century Poland due to the several wars and partitions that overcame this country for 123 years (Dobrowolska-Iwanek et al., 2014). The Second World War and the implementation of a new economic system in Poland ruined wine production. In the 1960s, various institutions and oenological centres, including the Grape Factory in Skierniewice, were liquidated (Pink, 2015). It was only in 1984 that a breakthrough took place in this industry when Roman Myśliwiec established the Golesz Vineyard in Jasło. His aim was to revive Poland’s historic wine tradition. Roman Myśliwiec also developed the first native grape variety which was named *Jutrzenka*. The grower himself was awarded the Commander’s Cross of the Order of Polonia Restituta (Wawro, 2011). Poland is a country that has favorable conditions for the cultivation of vines and wine production, with potentially 100,000 hectares of land that can be planted with vines (Poczta, Zagrodzka, 2016).

Climatic changes observed in recent years in Poland may have significantly impacted the acclimatisation and growth of plants typically cultivated in warmer regions in Europe (Olewnicki, 2018). According to Lisek (2008), the average annual temperature in recent decades has indicated an upward trend (around 0.5°C per decade), transitional periods have shortened, warm periods have lengthened, and winters have become milder which allows for the cultivation of several grape varieties. In addition, of all the climatic changes noted over the last few decades, the most significant include changes in annual air temperatures in growing seasons, expressed as the so-called average sum of active temperatures (SAT). The warming of

the climate in recent decades has favoured the development of viticulture and wine production and, above all, the gradual introduction of new grape varieties, immune or highly resistant to disease and with increased resistance to freezing temperatures. Vineyards have been established and developed not only in the voivodships commonly associated with this type of cultivation, i.e., voivodships in southern Poland but increasingly more frequently in the central and northern regions of Poland, which is a positive phenomenon.

The aim of this research was to assess the changes that occurred in grape production and the wine market in Poland in the years 2009-2021. Furthermore, the impact of thermal conditions on the development of viticulture in specific voivodships in Poland was also evaluated.

2. Methodology

This study was conducted based on the entries made in the wine production records kept by the National Centre for Agricultural Support (KOWR) and data obtained from the Institute of Meteorology and Water Management (IMiGW).

The main method of determining the changes occurring in wine production was the trend function, understood as the regression function relative to the time-dependent variant t . Among others, the dynamics of changes in the number of vineyards, grape cultivation areas, and the production and sale of wine in Poland were investigated (assuming 100% as the first year of the research period). The chain indices were calculated (with a variable basis) to determine the annual average rate of the studied changes, measured in a given period ($t_0; t_1$) by the difference between the average chain index of that period and the total value (Górczyński, 2004).

$$r_{t_0; t_1} = t_1 - t_0 \sqrt{\prod_{i=t_0+1}^{t_1} i_{i/i-1}} - 1 = t_1 - t_0 \sqrt{\frac{y_{t_1}}{y_{t_0}}} - 1 \quad (1)$$

For the purposes of assessing thermal conditions occurring in specific voivodeships and their impact on the location of vineyards in Poland, the average sum of active temperatures (SAT, i.e., the average daytime temperatures in growing seasons 10°C and higher, starting from 1 April to 30 October) between 2009 and 2021 were calculated based on IMiGW data. In the case of wine production, the SAT indicator is one of the most important indicators determining the possibility of producing wine in a given area (Rogowski, Kasianchuk, 2016). As many as 129 470 pieces of meteorological data obtained from the majority of meteorological stations found in specific voivodships were used to carry out the calculations. Stations located 400 metres above sea level were excluded due to the fact, as Myśliwiec (2013) indicates, it is best to plant vineyards at levels up to that altitude. The distribution of average SATs in terms of voivodeship were presented on cartograms. Cartographers point out that the most accurate method for developing maps according to this method is using relative data referring

to the entire area of the spatial unit marked on the map (Tomaszewska, 2009). As a result, the G. Jenks's optimisation method, known as the Natural Breaks Classification, was applied while elaborating the choropleth maps included in this study (Jenks, 1967). This method consists in minimising the variance within a separate class and maximising the variance between classes, in effect placing the boundaries of the intervals in the "natural breaks" in the statistical distribution. This is an iterative method that uses the sum of square deviations in particular observations. The analysed units found in a given class are similar in terms of the level of a given indicator; however, neither the same class span nor the same number of objects remains in the class (Paślowski, 1993).

As Dudek et al. (2011) emphasise, some decisions concerning local and regional markets should be taken based on knowledge of the territorial disproportion of market features in statistical terms. A research hypothesis was put forward, according to which the grape cultivation area in specific voivodships was adjusted to their thermal conditions. As the indicator of thermal conditions, a previously calculated SAT indicator was used – the average for 2009-2021. In the case of the cultivation areas, the last year in the study period was used as the current value and most representative of the development of viticulture from the moment records were kept at KOWR. Therefore, Florence's location co-efficient (F) was calculated according to the lowest formula, which may be applied, among others, to assess the distribution of businesses and farms relative to the factor that may determine its number.

$$F = \frac{\frac{1}{2} \sum_{i=1}^n (s_i - u_i)}{100} \quad (2)$$

where:

s – percentage structure of the first studied phenomenon according to spatial units,

u – percentage structure of the second studied phenomenon according to spatial units,

n – number of spatial units.

This indicator may take values ranging from $0 \leq F \leq 1$, where the value 0 signifies complete consistency in the territorial distribution of the two features compared, while the value $F = 1$ signified the territorial inconsistencies.

3. Results

Changes in the wine market

Detailed assessments of changes in Polish wine production can be conducted starting from 2009 when KOWR began to keep records. As Szymańska (2018) indicates, producers began registering themselves at the Agricultural Market Agency (currently KOWR) in 2008 and were included in the 2008-2009 marketing year. At the end of that year, 28 entities were registered. Over the following three marketing years, the number of registrations remained at a similar

level. A significant increase in businesses and producers interested in producing wine to be sold was observed in the 2012/2013 marketing year. This change was partially associated with an amendment to the Act on Production and Bottling of Wine Products, Trade in these Products and Common Organization of the Market in Wine, and further administrative facilitation. In this period, newly planted vineyards also began to enter the production phase. In the 2021/2022 marketing year, there were as many as 380 registered vineyard owners, and the total grape cultivation area encompassed 619.4 ha (Fig. 1). In relation to the 2009/2010 marketing year, the number of registered producers rose by 1709.5% while the grape cultivation areas expanded by 1620.1%. The average annual rate of changes in the number of producers was 27.3%, and in the case of grape cultivation areas, the rate similarly amounted to 26.8%. It should be emphasised that the increase in the number of producers and cultivation areas in the analysed period was exponential, resulting in consequent increases in its absolute values (Fig. 1). The high value of the coefficient of determination (adjustment), which in the case of the number of producers was $R^2=0.9788$ and $R^2=0.9800$ in the case of cultivation areas, attest to this exponential growth. A similar trend was observed in earlier years; however, according to Olewnicki's study (2018), the adjustment to the exponential trend was slightly weaker.

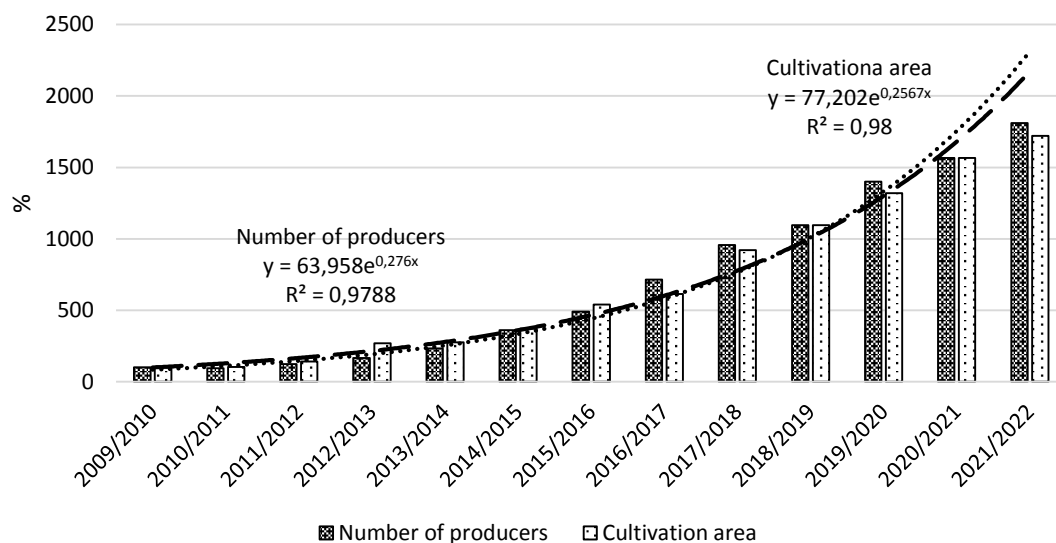


Figure 1. The dynamics of changes in grape cultivation area and the number of wine producers (registered in KOWR) in Poland in the 2009/10-2021/22 marketing years.

Source: own study based on KOWR data.

Overall, grape production has also shown an evident upward trend; however, trends have been slightly different when considering harvests of red and white grape varieties. The highest rate of changes has been noted in white grape varieties, whose harvests have grown exponentially in the analysed period. In the 2021/22 marketing year, 1953.2 tonnes of white grapes were harvested in Poland, i.e., nearly 66 times more than in the first year included in this study. In the case of red grape varieties, 967.3 tonnes were harvested, i.e., nearly 32 times more. In the case of the former, harvests took the form of an increasing linear trend (Fig. 2). The analysis presented above indicates that white grape varieties will continue to dominate over

the upcoming years of grape production in Poland since, as it is worth noting, the average annual increase of these varieties in the entire study period amounted to 41.8% and in the case of red grape varieties – 33.5%.

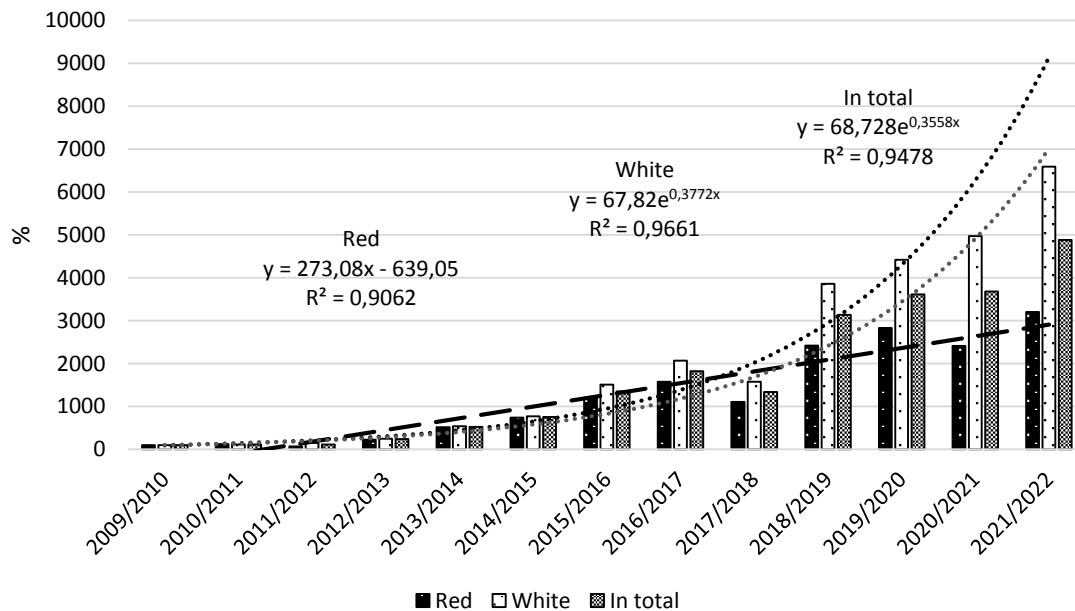


Figure 2. The dynamics of the grape harvest in total and according to red and white varieties in Poland in the 2009/10-2021/22 marketing years.

Source: own study based on KOWR data.

Larger harvests of white grape varieties and their greater dynamics directly translated into increased production of white wines in Poland. In the 2021/22 marketing year, 18 500 hL of wine were produced in Polish vineyards, of which close to 12 100 hL was white wine (approximately a 65% share). The development of viticulture in Poland and the growing fruit harvest resulted in the fact that the production of white wine in the 2021/2022 marketing year was 50 times higher than in the first year analysed (Fig. 3), with an average annual growth rate of 38.7%. Meanwhile, red wine production increased nearly 36 times, with an average annual growth rate of 34.9%. The rate of these changes would probably have been higher had it not been for the poor harvest of both white and red grape varieties noted in the 2017/18 marketing year.

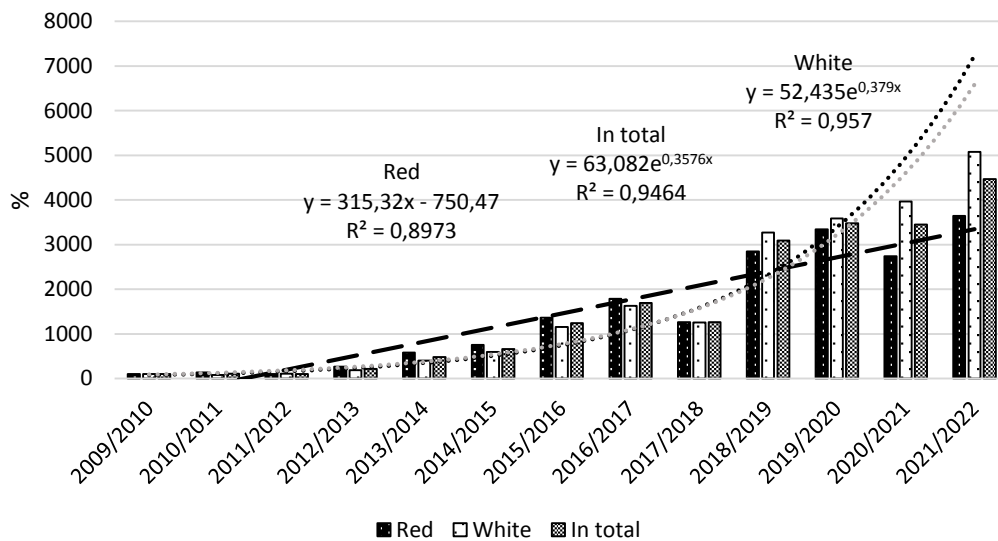


Figure 3. Dynamics of wine production in Poland in total and according to red and white varieties in the 2009/10-2021/22 marketing years.

Source: own study based on KOWR data.

As Szymańska (2018) pointed out, wine consumption in Poland was the lowest in Europe at the beginning of the second half of the last decade. It did not even reach 4 litres per resident, amounting to only 3.2 litres per person. Meanwhile, in France, it amounted to (42.5 litres); in Sweden (26 litres); in Germany (24.8 litres); in Great Britain (22 litres); in Spain (21.3 litres) and in Italy (33.3 litres). However, as the author indicates, the wine market in Poland has a strong growth potential and may accelerate. On this market, the premiumisation trend is growing in strength (i.e., a trend that more and more clearly dictates changes in the alcohol market and will dominate it in upcoming years), the amount spent on table and sparkling wines is quickly increasing, and Poles purchase wine primarily in supermarkets and hypermarkets. This trend is also evident in sales of wine produced in Polish vineyards. Although current and official data on the people who purchase Polish wine are unavailable, it may be assumed that, for the most part, Polish citizens buy Polish wine. The wine produced in Polish vineyards is featured increasingly more often in Polish stores and markets. Purchases are also made during visits to wineries and events promoting Polish winemaking. Taking into consideration the marketing years from 2010/11 to 2020/21, sales of wine produced in Polish vineyards in the last year included in the study were nearly 37 times higher relative to the first analysed year (Fig. 4). The average annual growth rate of sales amounted to 43.7% in this period. Furthermore, the dynamics of these changes took the form of an exponential trend, which is a positive phenomenon, giving an optimistic perspective for the future.

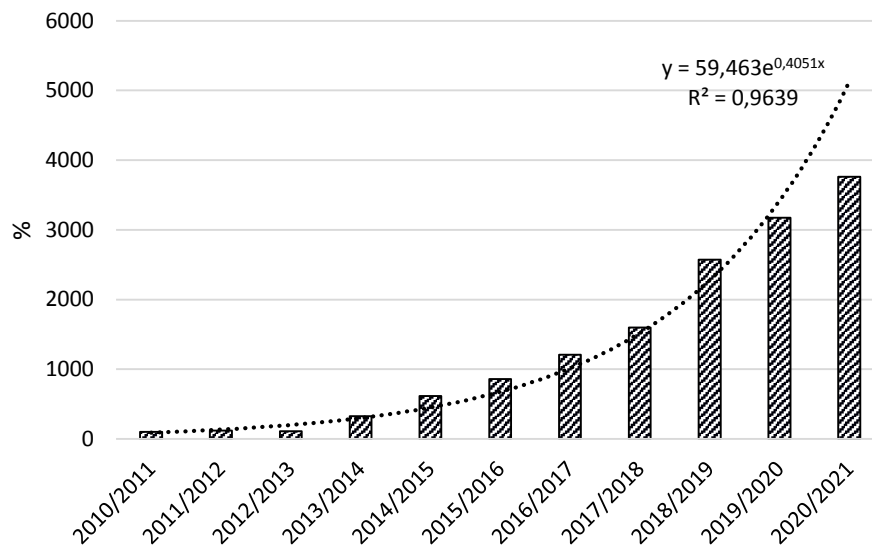


Figure 4. Dynamics of wine from Polish vineyards in given market years - 2010/11-2020/21.

Source: own study based on KOWR data.

The impact of thermal conditions on the development of wine production

It is assumed that commercial grape cultivation takes place in locations with a thermal growing season no shorter than 160 days. A growing season that is too short may be an obstacle in obtaining the appropriate grape ripeness and woody shoot, which significantly limits the possibility of cultivating certain grape varieties. As Bosak (2019) indicated, at the beginning of the last decade, not all regions of Poland had the same favourable climatic conditions needed to establish vineyards. The potential chances for successful grape cultivation were higher in the areas of Zielona Góra, Wrocław or Tarnów than in Masuria and Podlasie regions. Introducing new, early grape varieties, including ‘Solaris’ or ‘Rondo’, allow for obtaining a decent quality of wine even in north-eastern Poland; however, it would be difficult to guarantee a stable, profitable production in such local conditions. As a result, larger commercial vineyards should be established in warmer regions and in locations that ensure the best possible meso-climatic conditions. Only when these criteria are met will there be a chance to maintain constant and profitable wine production, even in less favourable vintages.

The conducted analysis made it possible to classify voivodeships according to the Jenks Natural Breaks Classification in terms of the average SAT in the years 2009-2021. Based on this analysis, three groups of voivodeships were distinguished, differing in the sum of active temperatures in the entire study period. The lowest SAT was noted in voivodeships located in the northern belt of Poland, i.e., Zachodnio-pomorskie, Pomorskie, Warińsko-Mazurskie and Podlaskie voivodeships, while the highest was found in the Lubuskie, Wielkopolskie, Opolskie, Śląskie and Małopolskie voivodeships (Fig. 5). The Dolnośląskie voivodeship deserves particular attention since it finds itself in the middle range according to the classification presented and is commonly associated with a highly developed viticulture in Poland.

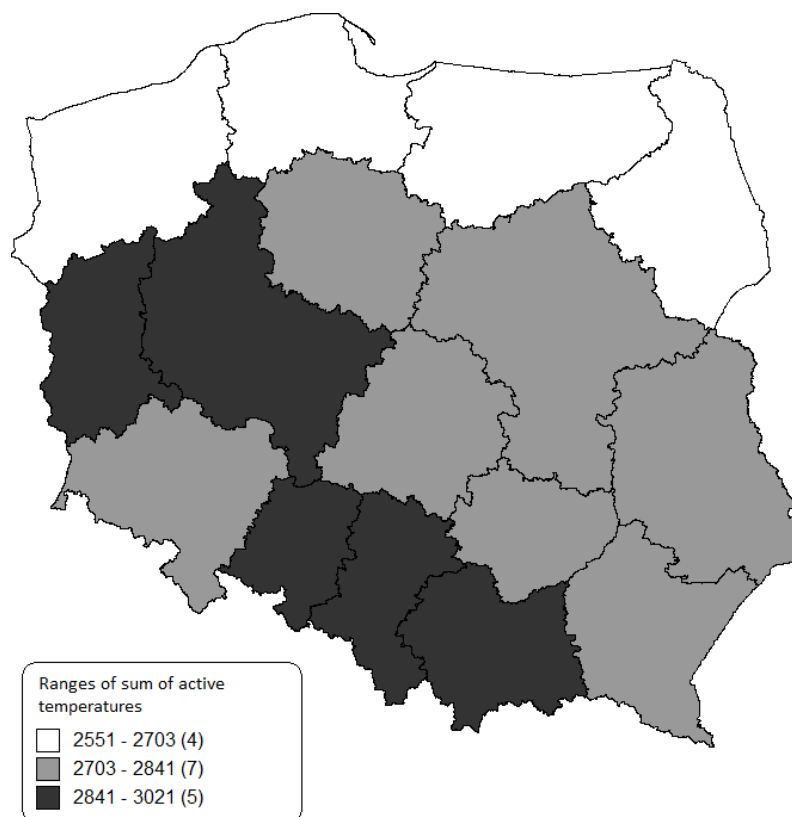


Figure 5. Classification of voivodships according to the sum of active temperatures according to the Jenks Natural Break Classification method – average from 2009-2021.

Source: own study based on IMiGW data.

The analysis presented above was supported by research on the location of grape cultivation areas in specific voivodships relative to their thermal conditions. The study results indicate that in the 2020/2021 marketing year, an average territorial concentration of cultivation areas relative to the calculated average sum of active temperatures occurred, and both of the analysed phenomena were relatively territorially compatible. This is indicated by the calculated Florence's location indicator, which in the 2020/2021 marketing year amounted to $F = 0.36$ respectively for the studied variables. As a result, the distribution of the analysed vineyards relative to the thermal conditions in a given region is relatively proportional across voivodships (provinces).

4. Summary and conclusions

This study shows that wine production in Poland is a rapidly developing component of horticultural production. The analysed statistical indicators point to this fact. The average annual growth rates deserve attention, which in the case of white grape harvests amounted to 41.8% and 33.5% for red grape varieties, while in the case of wine production, they were 38.7% and 34.9%, respectively. In general, since 2010/11, production in Poland has started to grow in

favour of white varieties, resulting in their current domination in wine production. This fact also translates into a significant share of white wines in national production, which constitutes approximately 65%. Studies on the location of vineyards in Poland indicate that their distribution relative to the thermal conditions in a given region is relatively proportional across voivodeships.

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