VITICULTURAL POTENTIAL ASSESSMENT AND ITS SPATIAL DELINEATION ANALYSIS IN GORIŠKA BRDA VITICULTURAL AREA

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Abstract:

Context and purpose of the study - Viticultural potential has a complex conditioning, determined by relief, soil, climate and lithology. Delineation of viticultural potential from vineyard areas is essential for the purpose to collect the necessary data for viticultural zoning. Using this data, we can achieve greater yield quality, which is the most important criteria in viticulture. The main purpose of this research is characterizing of viticultural potential and zoning of homogeneous viticultural zones in Goriška Brda region by assessing the suitability of defined ecological factors.

Material and methods - Fourteen environmental factors, which represent relief, climate, soil and lithology, were used to evaluate and determine the viticultural potential which is further delimited in homogeneous viticultural zones within Goriška Brda study site, characterized by a mild Mediterranean climate. Each zone was described in terms of its viticultural potential, which expresses the types of wine that can be produced according to its ecological suitability. The spatial distributions of the environmental parameters were achieved using GIS-based multicriteria methodology. Spatial analysis was conducted at fine scale.

Results - Inside of study area, there were defined three zones with different viticultural potential, indicating the wine types that can be produced: a zone suitable for quality white wines and red table wines; a zone suitable for quality white wines; a zone suitable for sparkling and white table wines and wines for distillates. These zones make up the viticulture potential map of Goriška Brda study site. The south-western area, closer to the Mediterranean Sea, was defined as mainly suitable to produce quality white wines. Nevertheless, the north-eastern part was defined as suitable for production of mainly white table wines, sparkling wines, and wines for distillates. This research provides a map of viticultural potential and delimitate viticultural homogeneous zones for the winegrowing area of Goriška Brda. It also provides a spatial analysis of the ecological structure with suitability of ecological factors for different wine types. The results reveal the high spatial variability of the viticultural potential when analyzed at fine scale.

Keywords: Zoning, GIS, grapevine, environmental factors, wine types, Slovenia.

1. Introduction.

Viticultural potential assessment and its spatial delineation analysis in Goriška Brda viticultural region

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Introduction

Assessment of viticultural potential from vineyard areas is essential for the purpose to collect the necessary data for viticultural zoning. Moreover, delineation of homogeneous zones in viticulture presents an important factor in planning and managing of vineyards targeting high yield quality. In order to define delineation, several parameters needed to be studied, above all, climate conditions and soil characteristics. However, the climate conditions present a critical factor in viticulture, which significantly impact the grape and wine quality. Using this data, we can achieve greater yield quality, which is the most important criteria in viticulture. The study defines new homogeneous viticultural zones using updated methodological approach and gives us an idea of how diverse the viticultural potential can be when analysed at fine scale.

Methodology

Goriška Brda (Brda), relatively small winegrowing district (1500 ha) is located in western part of Slovenia, next to viticultural region Friuli-Venezia Julia (Italy), with which shares common history and tradition and diverse relief (Figure 1). Traditionally is a wine-making region with intensive viticulture sector, among the world's most famous viticultural district from Slovenia.

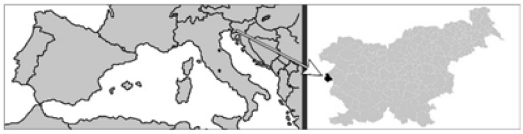

Figure 1: Location of Slovenia on the left map and study site Brda on the right map)

The spatial analysis of viticultural potential and suitability classification in this research was based on fourteen ecological factors, which represent relief, climate and soil of the viticulture area, were used to assess viticulture potential and to identify homogeneous viticultural zone. For each ecological factor were determined suitability ranking points intervals, corresponding to viticultural potential (Table 1) and by GIS analysis elaborating suitability maps (Fig. 2).

Table 1: Viticultural potential defined by ranking points and suitability classes.

Suitability class	Ranking points	Viticultural potential
I	10	Suitable for quality red wines.
	9	Suitable for red quality wines and secondary for white quality wines.
II	8	Suitable for quality white wines and secondary for res table wines.
	7	Suitable for white quality wines.
III	6	Suitable for white table wines, sparkling wines, wines for distillates and for white quality wines in very suitable years in terms of climate.
	5	Suitable for white table wines, sparkling wines and wines for distillates.
IV	0 to 4	Unsuitable for grape production.

Results

According to topographical suitability the class I (green and dark green colour) is characterised mostly in the areas with southern aspect (Fig. 2c) of Brda. Most favourable pedological suitability is situated in the Lower zone, represented with ranking points 9 (dark green colour, class I) (Fig. 2d). Climatic suitability (Fig. 2e) , corresponds mainly to the suitability class II and III with areas not suitable for grape production in Higher zone. The majority of the studied area according to the final suitability (Fig. 2f) correspond to the class II (yellow and dark green), located mostly in the Lower zone. Areas represented by the class III are mostly located in the Higher zone (orange and red).

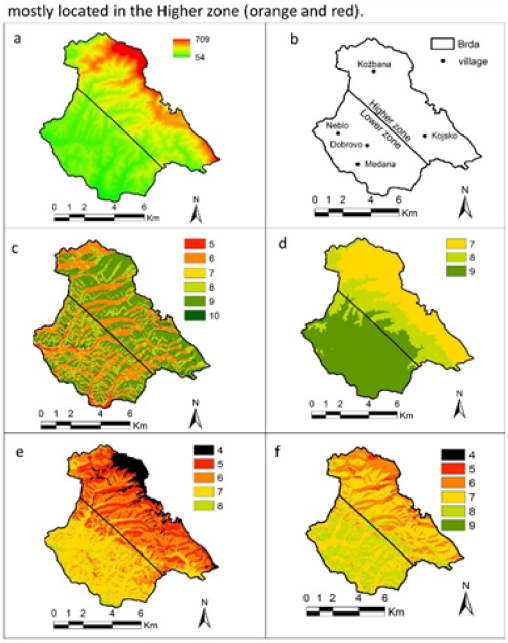

Figure 2: Digital Elevation Model of Brda (a) expressed in metres above sea level, partition in Lower and Higher zone with major villages (b), map of topographical (c), pedological (d), climate (e) and final (f) suitability. Ranking points for suitability maps are defined in the Table 1.

The Lower zone is mostly suitable for production of red quality wines and secondary for white quality wines. However, the Higher zone is mostly suitable for production of white table wines, sparkling wines and wines for distillates. Areas with southern aspect are especially suitable for production of high quality wines, due to increased sunshine duration and consequentially higher temperatures.

Conclusion

The need of spatial analysis of viticultural potential in wine-growing regions is becoming a necessary tool, due to the threat of rapid changes in climate patterns predicted for the future. The delineation of Brda presents an important instrument to confront the future variable climatic conditions and create valuable guidelines for wine makers, to continue production of quality grapes in the future. Moreover, the results of this research provide the essential tool, to improve the wine quality and to contribute to the positive economy boost in regional wine industry.

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