

INFLUENCE OF VITICULTURE ON THE TEMPORARY EVOLUTION OF THE LANDSCAPE: THE CASE OF THE AO RIBERA DEL DUERO (Central Spain)

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Abstract:

Introduction: The European Landscape Convention (ELC, 2001) defined the landscape as the "part of a territory as perceived by the population and resulting from the action of natural and/or human factors and their interrelationships". Wine landscapes, protected or not under figures such as cultural landscapes or Cultural heritage, are a clear demonstration of this definition, denoting the interrelationships of the natural environment and the action of the human, which modulates the territory to give the different wine landscapes.

This work was focused on the study of the effect of the human factors linked to the cultivation of the vine on the modification of the landscape.

Methods: Landscape images before and after the implantation of different vineyards, so as after the abandonment of some vineyard cultivation were studied to evaluate changes of landscapes from ecological and sustainable points of view. Furthermore, economical aspects were also considered.

Integral program and objective: This study is a component of a general program of terroir analysis conducted in Spain and that expanding over 5.5 million hectares and includes 370,000 ha of vineyards, using analysis scale of 1:50.000 or 1:25.000, depending on the region (Integral Viticultural Zoning, Gómez-Miguel & Sotés 1992-2018).

This work is focused on the special case of AO Ribera del Duero, which landscape has evolved intensively in the last decades. So, the main aim was the analysis of the effect of the temporary evolution (1952/2017) of the vineyard extension in the DO Ribera del Duero territory on its landscape, and its repercussion on the sustainable value of this territory.

Results: The study pointed out both positive and negative effect of the human factor on the landscape due to the vine cultivation. Consolidate viticulture landscape demands continue human action to prevent landscape deterioration, and new plantation obviously modifies the natural landscape, however the changes can also have positive effects, as for example ecological ones when erosion is reduced, or social and economic ones, when new attractive landscapes are created, and they will be used as an enotourism attraction.

Keywords: Viticulture, zoning, landscape, sustainability, enotourism, remote sensing.

1. Introduction



Influence of Viticulture on the Temporary Evolution of the Landscape: the Case of the AO Ribera del Duero (Central Spain)

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Abstract

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INTEGRAL PROGRAM and OBJECTIVE. This study is a component of a general program of territorial analysis conducted in Spain and that expanding over 5.5 million hectares and includes 385,000 ha of vineyards, using analysis scale of 1:50,000 or 1:25,000, depending on the region (Integral Viticultural Zoning, Gómez-Miguel & Sorés 1992-2018).

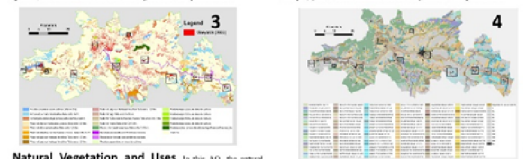
This work is focused on the special case of AO Ribera del Duero, which landscape has evolved intensively in the last decades (Fig. 3, 6 and 7). So, the main aim was the analysis of the effect of the temporary evolution (1956/2018) of the vineyard extension in the DO Ribera del Duero territory on its landscape, and its repercussion on the sustainable value of this territory.

GENERAL METHODOLOGY. First, the media factors that directly affect the vine crop in the AO Ribera del Duero are studied and cartographed; after that and depending on the results, the landscape units are defined and cartographed and finally through image analysis, remote sensing techniques and airphoto interpretation the results in different times (1956, 1973-1999, 2002, 2004, 2017) are compared and the modifications are assigned to their determinant causes.

FACTORS AND COMPONENTS OF THE LANDSCAPE. *In sensu lato* the landscape is lithology, hydrology, geomorphology (elevation, slope, exposition, orientation), natural vegetation and soil uses. In this study, the landscape is quantified by characterization of the lithological and morphological components (cartography of the geological formations, geomorphomes -not included-, integration of a digital elevation model to derive altitude, orientation, exposure, and slope -angle and longitude). Excluding criteria are determined from vegetation maps (natural and potential); the areas considered are those with endemic species and forest zones with important ecological value. Most of these variables are included in the concept of Soil Series.



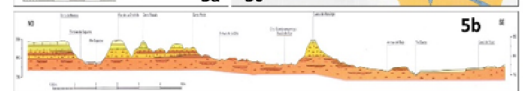
Climate. The homogeneous Climate Zones are defined from the statistical analysis of their elements (TEMP, humidity balance and Climatic Recurrence and vine-growing indices only). The result allows us to relate each production unit to its climate: only the climate zones 1 (brown) and 2 (yellow) have taken and will take new significant vine plantations.



Lithology. The rock nature is essential in the selection of the vine-growing terraces as an optimal production unit to obtain quality wines. Mainly clays and calcareous sands from the tertiary (B) and in smaller numbers the alluvial materials from the Duero river and smaller valleys (1) have taken and will take new significant vine plantations.

Natural Vegetation and Uses. In this AO, the natural vegetation conditions the landscape mainly due to its location in the surface of visual change of this landscape. Due to that, the most of the times, it is largely preserved and so the evolution of the vineyard has to be done necessary at the expense of other crops. The uses and developments, besides the vineyard that stays precisely limited by the contour line of 1000 m are included.

LANDSCAPE UNITS. The landscape units were mapped by superposing the information capes, that were previously mentioned, and grouping them according to their homogeneous characteristics (Fig 5; ITGE). There are several subzones (West central and east) with prevalence of certain groupings of landscapes and with a great number of variants.

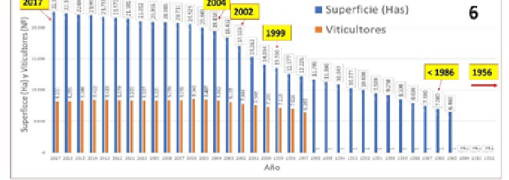


1. WEST REGION (Fig 5a). In the west subzone the predominant relief is that with slopes with black plateaus and slopes with hillsides that connect with the low terraces of the Duero river. When the clays and calcareous sands meet in the hillsides, the vineyard takes up this place and when they are in the slope or they don't exist, the vineyard comes down to the terraces.

2. CENTRAL REGION (Fig 5b). The central subzone is dominated by the great opening of the Duero river to the North that inserts itself among the different surfaces of parameras (P1, P2) and it becomes stabilized in the clays and calcareous sands (L). The vineyards fill preferably this layer originating wide undulating landscapes that are only cut by isolated hills (P23, P231).

3. EAST REGION (Fig 5c). In the eastern subzone the Duero river inserts itself in other materials and the most interesting lithology practically disappears, the height increases and the conditions for the vineyard are in general more unfavorable (climate). The result is a lower interest for the vineyard and the modifications in landscape during the studied period are only exceptional.

Evolution And Distribution Of The Vineyard



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