

## Identifying Research Opportunities at Douro Demarcated Region

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### ABSTRACT

The Douro Demarcated Region, in Northern Portugal, offers outstanding wines with unique characteristics. Due to the today's globalized marketplace, local producers often need to further develop their cultivation techniques to remain competitive. The Association of Viticultural Development in the Douro Valley (ADVID) works as a unit of experimentation, offering services and training to meet the demands of the Douro's vitiviniculturists. In 2009 the Association was promoted as "Douro Wines Cluster" by the Ministry of Economy of Portugal. That act requires an integrated plan to increase the level of technical and economical competence of the sector, as a differential of competitiveness for enterprises in the country and worldwide.

As a consequence, this work results in the creation of an action plan that represents the interests of members of ADVID. Therefore, in order to identify the producer's technical constraints, a qualitative survey was conducted, from April to August 2009 with members of the Douro Wines Cluster. That survey brought together a representative set of stakeholders, taking into account distinct member's profiles in terms of area under vineyards and location. The work identified 39 overriding Research and Development necessities for the region. The final list provides general guidelines to steer strategic research which are deemed to be the most relevant for the development of the Douro wine cluster.

### KEYWORDS

Wines, vines, viticulture, Douro, Cluster, Strategic Management

### INTRODUCTION

Over the last decades, there has been a decrease in global wine consumption as well as in wine production, particularly in Europe (OIV, 2009). The quality and originality in wines have increasingly relevance and the current globalized and highly competitive market requires more and more excellence and efficiency from the wine production. In the last two decades there has been a substantial growth in the wine world trade, but the five largest European Union exporters reduced their market share in favor of countries of the Southern Hemisphere and the United States (OIV, 2009)

In Portugal, viticulture stands for approximately 50% of the national agricultural sector (Europeu, 2007). The Douro Demarcated Region (DDR) includes about 250,000 ha, out of which 45,000 are used for viticulture – 19% of the Portuguese total vineyard area. Douro's total wine production represents 22.5% of Portugal's production, but that figure raises up to 39% when it refers to the production of wines with Denomination of Origin (IVV, 2010).

Aiming to contribute to the modernization of vitiviniculture, to increase the profitability of Douro Demarcated Region's vineyards, as well as to improve the quality

of its wines, the Association of Viticultural Development in the Douro Valley – ADVID – was founded in 1982. It has been supported by producers who respond for 55% of the Port wine business (ADVID, 2009). The Association plays a fundamental role, which is sharing knowledge between the research organizations that collaborate with it, and its 200 members, bringing together necessities and knowledge. In 2009, ADVID was recognized by Portugal's Ministry of Economy as a "Douro Wines Cluster", under the "Collective Efficiency Strategy" modality. The Association will be the entity responsible for the cluster and will develop R&D projects in partnership with other relevant players for the development of the sector at Douro. The goal is to improve the entire production cycle and assure that the results become widely known. This project requires that all identified initiatives must be integrated within the scope of an action plan, aiming to innovate, qualify and modernize a cluster of companies, highlighting their potentialities worldwide.

This paper analyses the Research and Development (R&D) needs specific to the producers of the Douro Demarcated Region who are members of ADVID – as well as those specific to players who are internal and external to the Association – and consolidates a knowledge base about the needs of this community. To undertake the data survey, 7 members of ADVID, 26 producers and 3 external players were interviewed "in depth". The objective was to investigate technical constraints that affect the region's development.

The next section addresses briefly the research possibilities potential at the region. We then discuss the methodological approach and the research execution planning. The adopted methodology is detailed, considering aspects such as ethnography, sample selection, data collection process and data analysis. Finally, the paper presents the results obtained through this qualitative research, broken down according to the themes that are the main focus of the research: R&D necessities.

## **DOURO'S RESEARCH NECESSITIES**

According to data from the Centre for Research, Environmental Sustainability and Advancement of Mountain Viticulture (CERVIM, 2009), the DDR is the most important surface among the world's mountain viticulture regions. In spite of that, the exceptional soil and climate conditions that favour the production of quality wines, of recognized specificity, oppose to poorly competitive revenues (Quatenaire & Portuguesa, 2007).

Approximately 35,000 vine growers currently work at Douro's vineyard area, at estates with an average of 1 ha of vineyards (IVV, 2010). Resistant to changes in their cultural practices, poorly qualified and mostly aged men, most of them are individual and autonomous producers, a category that corresponds to 88% of the exploitation and to 72% of the vineyard area.

Douro presents a varied array of research necessities, related to the previously described situations, to very peculiar climacteric and orographic characteristics, or to issues specific to the regional culture. There are many other research works related to the Douro region and its wines, however, they do not adopt a strategy oriented towards local necessities (Quatenaire & Portuguesa, 2007).

Anyway, due to the efforts of vine restructuring and wine production of the last years, some interesting results start to appear. As an example, there has been an expressive growth in the number of DDR wines that have achieved high ratings from the Wine Spectator magazine, an internationally recognized publication (Tab. 1) (Graça, 2007). This recent development coincide with the implementation of courses about enology

and viticulture, namely at the University of Trás-os-Montes and Alto Douro, in the 1980s, as well as at other universities in Portugal.

**Table 1 – Number of Portuguese wines rating more than 90 points at Wine Spectator**  
(source: Wine Spectator Online – [www.winespectator.com/Wine/Home/](http://www.winespectator.com/Wine/Home/))

Region	Until 1975	1975-1985	1985-1995	1995-2005
Other regions in Portugal	24		2	22
Douro			3	150
Port Wines (fortified)	88	30	65	125
<b>TOTAL WINES</b>	<b>114</b>	<b>30</b>	<b>70</b>	<b>297</b>

The industrial sector's ability to forecast trends and innovate through services and products is linked to its investment in R&D. Therefore, in order to solve the structural problems of Portugal's wine sector and increase its competitiveness, it is imperative to invest in R&D (VINIPORTUGAL, 2005).

## METHODOLOGY

A qualitative approach was defined, considering that the work was developed in a specific context, with a reduced number of samples (Neuman, 2006). A thematic analysis was conducted with the participation of the researcher. Once this work aimed to identify demands of a group of different players that integrate the Douro's Wines Cluster's context, we decided to perform a field research with a triangulation of research methods to increase the collected data's reliability and the researcher's knowledge about the thematic (Denzin, 1978) (Webb, Campbell, Schwartz, & Sechrest, 1966).

The research process included document analysis, direct observation, interviewing and results' analysis in a single research cycle. Initially, the researcher collected and analyzed documents that characterize the research context and the work's scope. Technical terms, social and economical aspects of the region, and detailed aspects of the Association's strategic orientation were extracted from ADVID's internal documents.

In order to capture ethnographic aspects, supported by observation and participation in each different environment, the researcher spent a three months period in field, working with the technical staff of ADVID. This procedure helped him to understand how the Association works, its processes and dynamics. Visits to producers' wine estates and several wine growing activities were registered with notes, pictures and digital video recordings.

The interviewing process, aiming at gathering the opinions about the studied subjects, happened with members of the Association and important external players in the business. All types of members were involved: permanent, cooperative and individuals members, from all Douro's sub-regions (Baixo Corgo, Cima Corgo and Douro Superior) and owners of different-sized wine estates. The 26 producers who were interviewed, with an age average of 47 years old, hold 71% of the total vineyard area belonging to ADVID's members. Three other agents of Douro wine industry were interviewed.

Interviews with producers and other players were held on a semi-structured format, preferably at the interviewee's own work environment (Porto and Douro), as it was more convenient and informative. The interviews were initially focused on the production cycle, with the purpose of identifying technical constraints within the wine growing activity, in order to evaluate its importance.

All the ADVID technical employees were interviewed collectively, with the exception of the Executive Director, in order to attain agreement on the Association's perspective about producers and other players' necessities. All interviews were recorded and fully transcribed. At the end, the surveyed data were analyzed and compared with the concepts identified from the outset of the study, resulting in a wide set of categories and

subcategories that represent the producers needs and require further investment in R&D. To refine data we used the concept of “Theoretical Saturation”, which determines that the data collection should not be over until the categories that may have arisen during the research are not saturated (Strauss & Corbin, 1998). Once this balance was achieved, the results were organized as shown at the next section.

**RESULTS AND DISCUSSION**

Through the analysis it was possible to define a set of priorities for a specific agenda for Research & Development in the DDR, aiming to improve the operational efficiency of the wine growing production. We pointed out 39 possible research areas, organized by categories (Vine varieties, Vine varieties adaptation, Equipment, Vineyard, Labor force, Tourism, Enology, Access to the wine estates, Renewable energy) and subcategories. The importance of defining different categories can be depicted from the figure bellow (Fig. 1), which classifies them according to the statements made by the different players who were interviewed:

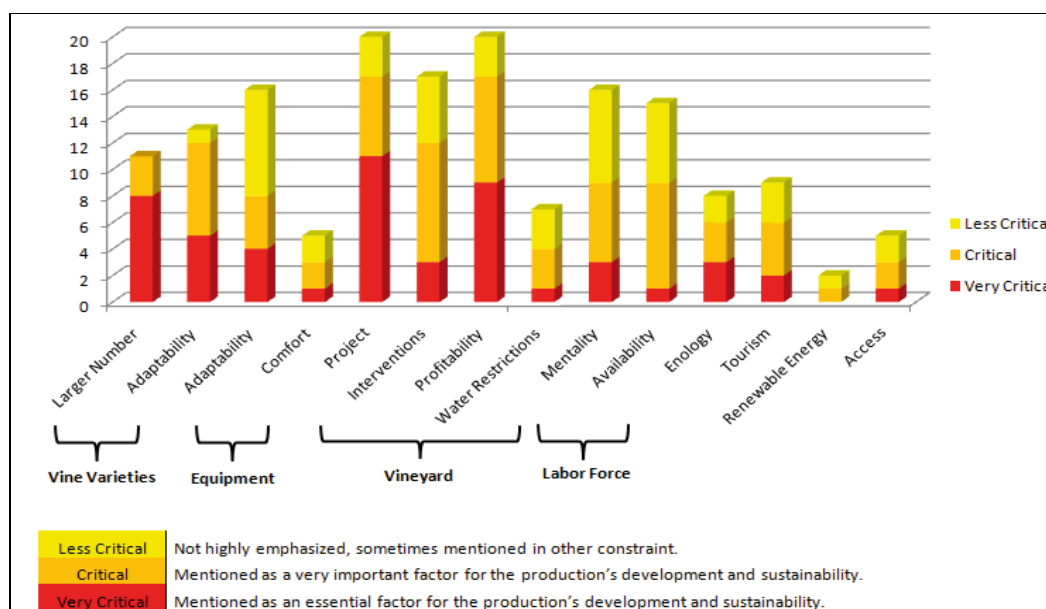


Figure 1 – Criticality of Douro's Research Opportunities

The following categories and subcategories (Tab. 2) represent the R&D necessities of Douro Demarcated Region. Together with the criticality exposed above, explicit priorities in terms of lines of research to be undertaken in the region:

Table 2 – Research opportunities at the Douro's region

Category
Subcategory
Research Areas
<b>Category 1 – Vine varieties</b>
<b>Subcategory 1a – Characterization of a larger number of vine varieties</b>
R&D over a larger set of vine varieties, foreseeing ideal characteristics for cultivation, productivity and related costs.
Study on vine varieties ripping.
Enological value potential of Portuguese autochthonous vine varieties.
<b>Subcategory 1b – Vine varieties adaptation to different situations</b>
More suitable blending of vine varieties and rootstocks. Usage of vine varieties in different zones, clones adaptability to specific regions and to grafts.
Study on the different characteristics that vine varieties may present, at old or new vineyards.
Study on how vine varieties develop, as a result of climate changes.

Category
Subcategory
Research Areas
<b>Category 2 - Equipment</b>
<b>Subcategory 2a – Equipment adaptability to the region</b>
R&D to develop or adapt pieces of equipment according to the region's specific necessities.
<b>Subcategory 2b – Comfort and ergonomics</b>
Development of materials or pieces of equipment that provide more comfort to workers in the field, encompassing ergonomics, breathable materials and reduction of weight and noise.
<b>Category 3 - Vineyard</b>
<b>Subcategory 3a – Vineyard's project</b>
Study on cost differentiation for vineyard implementation projects at different sub-regions
Study on markets that producers seek, in order to determine which vine varieties should be recommended for the projects.
Study on best method options for converting vineyards and olive groves, for each location (terrain slope, altitude).
Study on alternative methods of vineyards' conversion.
Study on ideal combinations of vine varieties, clones and rootstocks.
Study on the best options for vineyards' staking, considering different zones, vine varieties and rootstocks.
<b>Subcategory 3b – Interventions (applying products, vineyard operations, biodiversity)</b>
Study on the relation between vegetative balance and interventions in old and new vineyards. Reduction of herbicides usage.
Study on alternative methods aiming the protection of talus slopes from erosion, avoiding herbicides.
Study on the consequences of applying products in the vineyard and how it may affect the wines.
Study on the efficiency of using herbicides and sulfates, on different situations and amounts.
Interrelation between operations and grape quality (weeding, diseases' treatment, fertilization and defoliation).
Optimizing the interventions, through combined treatments which may reduce costs (i.e., mildew and oidium).
<b>Subcategory 3c – Profitability</b>
Study on a grape valuation method that will consider the fruit's quality.
Study on the profitability and feasibility of a co-operative of machines and wine cellar, aiming producers that are located nearby, and vineyards of small dimensions. Group acquisition of products used during the production cycle.
Quantitative modeling about the usage of specific cultural practices and their related productivity (example: manual pruning x electrical pruning).
Marketing research: definition of markets for specific wines.
<b>Subcategory 3d – Water restrictions</b>
Study on the grapevine's water conditions, associated with optimized modes of intervention (watering, pruning, ways of training the vines) for each situation.
Study on measurement and control of plant's water need.
<b>Category 4 – Labor force</b>
<b>Subcategory 4a – Mentality (resistance to change)</b>
Study on behavioral aspects within Douro's labor force, which is resistant to change.
Sociology research: study on efforts to change the rural workers perspective towards the type of work they undertake.
<b>Subcategory 4b – Availability</b>
Industrial Management: objective prediction of the date of the grape harvest, which may benefit the planning of labor force allocation.
<b>Category 5 - Tourism</b>
Marketing and tourism: focus on the region's landscape, cultural and historical potential. Identifying the target market and the necessary structure to meet its demands through exploiting Douro's potential for quality tourism.
Study on the possibility of returning part of the taxes generated by tourism to the maintenance of the World Heritage.
<b>Category 6 - Enology</b>
Impact (estimates) of determined cultural practices on the quality of wines: graveling and sulfide compounds application.
Ratio between ripping and quality. Study on optimum situations for grape harvesting.
Studies on themes related to enological processes: filtering, yeast usage, bottling, hygiene.
Studies on alcohol-free wines.
<b>Category 7 – Access to the wine estates</b>
Survey of products outflow alternatives.
Study on how to improve the access to the wine estates. Associated with costs, land consolidation.
<b>Category 8 – Renewable energy</b>
Study on ways to use energy obtained from natural sources.
Study on how to apply the profit obtained with the locally produced electricity.

## CONCLUSIONS

This qualitative study covered a significant sector of the Portuguese economy. The Douro Demarcated Region presents a high growth potential, which is lacking in research and development due to its orographic situation and economical and behavioral factors. The results of this study provided guidelines for a development strategy that may support the competitive differentiation of Douro's wines, considering the recognition ADVID obtained in 2009 as "Douro Wines Cluster".

The information gathered through the data survey is therefore, strategic to the Association and the Douro region, as it tries to identify the most relevant R&D priorities according to the perspective of its producers. The study elicited 39 possible research areas, organized by categories and subcategories. It makes it possible to improve planning in order to fill up the gaps identified through the research, by defining a specific R&D agenda, where research areas' priorities may be defined.

Even though the diversity of involved players is representative and the information gathered is thorough, but the sample size might be extended to cover the whole community and the results are not peremptory. Aiming to steer the ADVID strategy and to validate the findings of this study, we recommend the additional development of a quantitative analysis of the results with producers, including the assessment of the priorities that were pointed out during the necessities' survey.

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